Supreme Court, U. S.
FILED
JUN 2 1977
MICHAEL RODAK, JR., CLERK

APPENDIX

VOLUME I

PAGES 1 - 400

IN THE

Supreme Court of the United States

OCTOBER TERM, 1976

No. 76-419

VERMONT YANKEE NUCLEAR POWER CORPORATION,

Petitioner

v.

NATURAL RESOURCES DEFENSE COUNCIL, INC., ET AL.,

Respondents

No. 76-528

CONSUMERS POWER COMPANY,

Petitioner

v.

NELSON AESCHLIMAN, ET AL.,

Respondents

ON WRITS OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

PETITIONS FOR WRITS OF CERTIORARI FILED
SEPTEMBER 21 AND OCTOBER 14, 1976
CERTIORARI GRANTED FEBRUARY 22, 1977

TABLE OF CONTENTS

VOLUME I

Page(s)

I. DOCKET ENTRIES

A. Docket Entries in *Natural Resources Defense Council, Inc.* v. *NRC.*, No. 74-1385 (D.C. Cir.) .. 1

B. Docket Entries in *Natural Resources Defense Council, Inc.* v. *NRC*, No. 74-1586 (D.C. Cir.) .. 6

C. Docket Entries in *Aeschliman* v. *NRC*, No. 73-1776 (D.C. Cir.) 13

D. Docket Entries in *Saginaw Valley Nuclear Study Group* v. *NRC*, No. 73-1867 (D.C. Cir.) 19

II. THE OPINIONS OF THE COURT OF APPEALS

A. *Natural Resources Defense Council, Inc.* v. *NRC*, Nos. 74-1385, 74-1586 (D.C. Cir. July 21, 1976) .. 28

B. Order Correcting the Opinion in *Natural Resources Defense Council, Inc.* v. *NRC*, Nos. 74-1385, 74-1586 (D.C. Cir. October 8, 1976) (*Per Curiam*) 87

C. *Aeschliman* v. *NRC*, Nos. 73-1776, 73-1867 (D.C. Cir. July 21, 1976) 89

III. DECISIONS OF THE UNITED STATES ATOMIC ENERGY COMMISSION AND ITS BOARDS IN ADJUDICATORY LICENSING PROCEEDINGS•

A. Decisions in *Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Nuclear Power Station), Dkt. No. 50-271 112

1. *Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Nuclear Power Station), ALAB-56, 4 AEC 930 (1972) 112

2. *Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Nuclear Power Station), ALAB-179, 7 AEC 159 (1974) 130

• *Note:* "CLI" denotes a decision of the Commission; "ALAB" denotes a decision of the Atomic Safety and Licensing Appeal Board; "LBP" denotes a decision of the Atomic Safety and Licensing Board.

TABLE OF CONTENTS — Continued

Page(s)

B. Decisions in *Consumers Power Company* (Midland Plant, Units 1 & 2), Dkt. Nos. 50-329, 50-330 173

1. *Consumers Power Company* (Midland Plant, Units 1 & 2), ALAB-60, 5 AEC 261 (1972) . 173
2. *Consumers Power Company* (Midland Plant, Units 1 & 2), LBP-72-34, 5 AEC 214 (1972) 184
3. *Consumers Power Company* (Midland Plant, Units 1 & 2), ALAB-101, 6 AEC 60 (1973) 223
4. *Consumers Power Company* (Midland Plant, Units 1 & 2), ALAB-106, 6 AEC 182 (1973) 241
5. *Consumers Power Company* (Midland Plant, Units 1 & 2), ALAB-123, 6 AEC 331 (1973) 254
6. *Consumers Power Company* (Midland Plant, Units 1 & 2), ALAB-160, 6 AEC 1002 (1973) 322
7. *Consumers Power Company* (Midland Plant, Units 1 & 2), CLI-74-5, 7 AEC 19 (1974) .. 324
8. *Consumers Power Company* (Midland Plant, Units 1 & 2), CLI-74-7, 7 AEC 147 (1974) . 346
9. *Consumers Power Company* (Midland Plant, Units 1 & 2), CLI-74-8, 7 AEC 149 (1974) . 348
10. *Consumers Power Company* (Midland Plant, Units 1 & 2), CLI-74-15, 7 AEC 311 (1974) . 350

IV. NOTICES, ORDERS, REPORTS AND PROMULGATIONS OF THE UNITED STATES ATOMIC ENERGY COMMISSION AND ITS HEARING BOARD IN DKT. NO. RM-50-3

A. Atomic Energy Commission, Environmental Effects of the Uranium Fuel Cycle, Notice of Proposed Rulemaking, 37 Fed. Reg. 24191 (Nov. 15, 1972) 352

B. Atomic Energy Commission, Dkt. No. RM-50-3, Environmental Effects of the Uranium Fuel Cycle, Notice of Hearing, 38 Fed. Reg. 49 (Jan. 3, 1973) 361

TABLE OF CONTENTS — Continued

Page(s)

C. *Amendment of 10 CFR Part 50-Licensing of Production and Utilization Facilities* (Environmental Effects of the Uranium Fuel Cycle), Dkt. No. RM-50-3, Report to the Commission By The Nuclear Fuel Cycle Hearing Board (July 6, 1973) .. 364

D. Atomic Energy Commission, Environmental Effects of the Uranium Fuel Cycle, 39 Fed. Reg. 14188 (Apr. 22, 1974) 385

VOLUME II

V. OTHER PARTS OF THE RECORD TO WHICH THE PARTIES WISH TO DIRECT THE COURT'S PARTICULAR ATTENTION

A. From the Record in *Natural Resources Defense Council, Inc.* v. *NRC*, Nos. 74-1385, 74-1586 (D.C. Cir.) 401

1. From the Proceedings Before the United States Atomic Energy Commission in *Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Nuclear Power Station), Dkt. No. 50-271 401
   a. Pages 2-5 of the Vermont Yankee Nuclear Power Station Summary of Application (Ex. 3) 401
   b. Page 5 of the USAEC Staff Safety Evaluation, Vermont Yankee Nuclear Power Station (Ex. 9) 408
   c. Atomic Safety and Licensing Board Order Determining Objections to Interrogatories Submitted by Natural Resources Defense Council, Inc. (May 11, 1971) 410
   d. NRDC Interrogatories to Vermont Yankee Nuclear Power Corporation and Answers Thereto (June 1, 1971) 412

TABLE OF CONTENTS — Continued

Page(s)

e. Atomic Safety and Licensing Board Order Denying Motion of Intervenor NRDC Respecting Preparation of a New Detailed Statement of Environmental Considerations and for Rehearing of Order on Interrogatories (July 20, 1971) 485

f. Transcript of Proceedings Before Licensing Board, pp. 2149-2191 (Oct. 21, 1971) . 488

g. Atomic Safety and Licensing Board Order of Referral of Rulings (Dec. 29, 1971) .. 520

h. Sections III.D.2, III.E, and page IX-1 of Final Environmental Statement for Vermont Yankee Nuclear Power Station, USAEC Directorate of Licensing (July 7, 1972) 522

2. From the Proceedings on Environmental Effects of the Uranium Fuel Cycle, Dkt. No. RM-50-3 538

a. Atomic Energy Commission, Environmental Survey of the Nuclear Fuel Cycle (Nov. 1972) Summary; Part F (Irradiated Fuel Reprocessing); Part G (Radioactive Waste Management); Part O (Overview) 538

b. State of New York, Comments on the Environmental Survey of the Nuclear Fuel Cycle, (Jan. 18, 1973) 647

c. Transcript of Proceedings Before Hearing Board (Jan. 17, 1973, Feb. 1-2, 1973) 655

d. General Electric Company, Supplemental Written Statement (March 1, 1973) 1024

e. Consolidated National Intervenors et. al. Statement With Respect to Legal Considerations of the Proposed Regulations on the Nuclear Fuel Cycle (March 2, 1973) 1035

TABLE OF CONTENTS — Continued

Page(s)

f. Staff Summary Comments on Proceeding for Environmental Effects of the Uranium Fuel Cycle, pp. 43-53 (March 19, 1973) .. 1058

g. Supplementary Comments by the Union of Concerned Scientists on the "Environmental Survey of the Nuclear Fuel Cycle" 1067

h. General Electric Company, Comments on the Supplementary Comments by the Union of Concerned Scientists, pp. 1-2 (undated) 1152

i. New York State Atomic Energy Council Comments on the Supplementary Comments by the Union of Concerned Scientists, pp. 1-6 (April 13, 1973) 1155

j. Response of 14-Member Utility Group to "Supplementary Comments" of CNI-UCS, pp. 1-21 (April 13, 1973) 1165

k. Nuclear Fuel Services, Inc. Response to Union of Concerned Scientists, pp. 1-7 (April 16, 1973) 1186

l. USAEC Environmental Survey of the Uranium Fuel Cycle, WASH-1248 (April, 1974) Preface; Part F (Irradiated Fuel Reprocessing); Part G (Radioactive Waste Management); Part O (Overview). 1194

B. From the Record in *Aeschliman* v. *NRC*, Nos. 73-1776, 73-1867 (D.C. Cir.) 1340

1. Statement of Environmental Contentions by Saginaw Valley Intervenors, et al. in AEC Dkt. Nos. 50-329, 50-330 1340

GENERAL DOCKET

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

DATE	FILINGS — PROCEEDINGS	Filed

[No. 74-1385]

(G) 3-27-74 4 — Petitioners' petition for review of an order of the AEC (m-27)

(G) 3-28-74 Certified copy of petition for review of an order of the AEC was mailed to AEC & United States Attorney General

(G) 4-4-74 4 — Motion of Vermont Yankee Nuclear Power Corporation for leave to intervene (m-2)

(B) 4-30-74 Clerk's order granting motion of Vermont Yankee Nuclear Power Corp., leave to intervene; Counsel for intervenor may participate in oral argument only to the extent allowable under Rule 12 of the General Rules of this Court

(G) 5-6-74 Certified Index to Record (n-4)

(G) 6-11-74 4 — Petitioners' motion to extend time to file brief to July 26th (m-7)

(B) 6-21-74 Clerk's order granting petitioners' motion to extend time to file brief; and time for filing petitioners' brief is extended to July 21st

(G) 6-26-74 4 — Petitioners' motion to consolidate with No. 74-1586 (m-26)

(L) 7-5-74 4 — Respondents' opposition to motion to consolidate (m-5)

(B) 7-8-74 4 — Opposition of intervenor, Vermont Yankee Nuclear Power Corp., to motion to consolidate (m-8)

(G) 7-15-74 4 — Petitioners' motion to extend time to file brief to August 25th (m-15)

(G) 7-15-74 4 — Petitioners' reply to respondents' and intervenor's opposition to motion to consolidate (m-15)

(I) 8-16-74 4 — Petitioners' motion to extend time to file brief to 30 days from the date of order granting or denying petitioners' motion to consolidate (m-16)

DATE	FILINGS — PROCEEDINGS	Filed
(M)10-3-74	Order per CJ Bazelon denying motions to consolidate; the time for filing petitioners brief in this case is extended to November 2nd; sua sponte, that the Clerk is directed to schedule this appeal for oral argument on the same day and before the same panel of this Court as appeal no. 74-1586	
(G)11-1-74	4 — Petitioners' motion for leave to file a deferred appendix (m-1)	
(L)11-4-74	7 — Petitioner's Brief (m-4)	
(B)11-12-74	Clerk's order granting parties leave to proceed under the provisions of Rule 30(c) FRAP, in lieu of submitting one copy of the typewritten or page proof brief provided under Rule 30(c) FRAP, counsel for parties shall submit 7 copies thereof for filing	
(G)11-12-74	4 — Petitioners' motion to correct errors in brief (m-12)	
(M)11-18-74	Clerk's order granting motion of petitioners' to correct errors in brief	
(M)11-27-74	4 — Respondent's motion to extend time to file brief to February 7th (m-26)	
(M)11-29-74	4 — Motion of the Intervenor Vermont Yankee Nuclear Power Corp. to extend time to file brief to February 7th (m-26)	
(M)12-4-74	Clerk's order granting respondent's motion to extend time to file brief to February 7, 1974	
(M)12-5-74	Clerk's order granting motion of the intervenor Vermont Yankee Nuclear Power Corp. to extend time to file brief to February 7th	
(I) 2-5-75	7 — Brief for The Intervenor (Vermont Yankee Nuclear Power Corp.) (m-4)	
(L) 2-7-75	7 — Respondent's Brief (m-7)	
(L) 2-7-75	4 — Motion of United States Nuclear Regulatory Commission to substitute NRC for AEC as a respondent in this case (m-7)	
(G) 2-12-75	Clerk's order granting respondent's motion for substitution of party and the Clerk is directed to remove the United States Atomic Energy Commission from the docket as respondent and substitute therefor the United States Nuclear Regulatory Commission	

DATE	FILINGS — PROCEEDINGS	Filed
(B) 2-21-75	7 — Petitioner's typewritten reply brief (m-21)	
(B) 2-27-75	7 — Joint appendix (m-27)	
(B) 3-10-75	15 — Respondents' brief (m-5)	
(B) 3-10-75	25 — Brief for Intervenor Vermont Yankee Nuclear Power Corp., (m-7)	
(B) 3-13-75	15 — Petitioner's brief (m-13)	
(B) 3-13-75	15 — Petitioner's reply brief (m-13)	
(R) 5-8-75	Clerk's order sua sponte, that this appeal is consolidated with appeal no. 74-1586 for oral argument; sua sponte, that the following times are allotted for oral argument; Petitioners in both cases — 30 minutes (to be divided as they see fit) and respondent — 30 minutes	
(K) 5-15-75	4 — Joint motion for reconsideration of order consolidating oral arguments in 74-1385 and 74-1586 (m-14)	
(K) 5-15-75	Letter from Respondent advising of additional authorities pursuant to Local Rule 8(g)	
(R) 5-22-75	Clerk's order denying the motion for reconsideration; the Court will consider extending time available to each side at argument if circumstances warrant	
(K) 5-22-75	4 — Petitioner's motion for leave to allow three counsel to argue for petitioners (m-22)	
(R) 5-27-75	Argued before CJ Bazelon; George C. Edward, Jr., CJ for the Sixth Circuit, sitting by designation; and Tamm, CJ	
(R) 5-28-75	Per Curiam order granting motion for leave to permit three counsel to argue for petitioners; CJ Bazelon; Edwards, U.S. CJ for the Sixth Circuit, sitting by designation; and Tamm, CJ	
7-21-76	Opinion for the Court filed by Chief Judge Bazelon.	
7-21-76	Separate statement of Chief Judge Bazelon.	
7-21-76	Separate statement filed by Circuit Judge Tamm, concurring in result.	
7-21-76	Judgment remanding case to the NRC.(n)	
(C) 8-2-76	4 — Intervenor's motion to extend time to file petition for rehearing to Aug. 25 (m-30)	

DATE	FILINGS — PROCEEDINGS	Filed
(H) 8-3-76	4 — Respondents' motion to extend time to file petition for rehearing and/or suggestion for rehearing en banc to August 25, 1976 (m-2)	
(C) 8-6-76	4 — Petitioners' opposition to motions to extend time to file petition for rehearing (m-5)	
(C) 8-6-76	4 — Petitioners' motion for issuance of mandate forthwith (m-5)	
(C) 8-11-76	4 — Respondents' motion for stay of mandate (m-11)	
(C) 8-12-76	4 — Intervenor's opposition to petitioners' motion for issuance of mandate forthwith (m-10)	
(K) 8-20-76	Per Curiam order that the motions of intervenor-appellee Vermont Yankee Nuclear Power Corp., of intervenors Baltimore Gas and Electric Co., et al and respondents NRC and US to extend time to file petitions for rehearing to August 25, 1976 are granted; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit, sitting by designation and Tamm, CJ	
(K) 8-23-76	Per Curiam order that petitioners' motion for issuance of mandate forthwith is denied; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit sitting by designation and Tamm, CJ	
(K) 8-23-76	Per Curiam order that respondents' US and NRC motion for stay of mandate pending decision on their motion to extend time to file petition for rehearing and/or suggestion for rehearing en banc is granted; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit, sitting by designation, and Tamm, CJ	
(K) 8-23-76	4 — Intervenor's (Vermont Yankee Nuclear Power Corp.) motion for stay of mandate (m-20)	
(K) 8-23-76	4 — Respondents' motion for stay of mandate and correction of opinion (m-20) (Ok, GF)	
(G) 8-25-76	4 — Petitioners' opposition to motion for stay and correction of opinion (m-24)	
(C) 8-26-76	4 — Motion of Robert Jeffers, David Hensler, Patrick Raher & George W. Mayo, Jr. to withdraw as counsel for petitioner NRDC (m-26)	
(G) 9-1-76	4 — Respondents' reply to opposition to motion for stay of mandate (m-30)	

DATE	FILINGS — PROCEEDINGS	Filed
(G) 9-17-76	4 — Respondents' motion for further stay of mandate (m-15)	
(C) 9-23-76	Notice from Clerk, Supreme Court that writ of certiorari was filed in SC No. 76-419 on Sept. 21	
(K) 10-7-76	Per Curiam order that the motion of Robert M. Jeffers, David J. Hensler, Patrick M. Raher and George W. Mayo, Jr., to withdraw their appearances as counsel for petitioner Natural Resources Defense Council, Inc., is granted; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit sitting by designation and Tamm, CJ	
(K) 10-8-76	Per Curiam order that the Clerk is directed to file the document titled "Stipulation" which had been lodged in the Clerk's Office by petitioners on 8/16/76, and that the motions for stay of mandate are granted, and the Clerk is directed not to issue the mandate herein prior to October 31, 1976, on condition that the United States Nuclear Regulatory Commission shall make any licenses granted between July 21, 1976 and such time when the mandate is issued subject to the outcome of the proceedings herein; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit, sitting by designation and Tamm, CJ	
(K) 10-8-76	4 — Stipulation of Petitioners dated 8/16/76	
(K) 10-8-76	Per Curiam order that respondents' motion for correction of this Court's opinion dated July 21, 1976, is granted in part, and the opinion dated July 21, 1976 is amended as follows: On page 34, delete lines 3-5. On page 34, delete footnote 53 and renumber all succeeding footnotes. On page 41, delete the following from footnote 59: "In this case the board members asked no questions whatsoever of Dr. Pittmann. *See supra* note 53." In all other respects, respondents motion for correction is denied; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit, sitting by designation and Tamm, CJ	
(C) 10-15-76	Copy of letter from Clerk, Supreme Court extending time to file petition for writ of certiorari in No. A-285 to Nov. 18	
(H) 11-8-76	4 — Letter from NRC advising of additional authorities pursuant to Rule 8(g)	

DATE	FILINGS — PROCEEDINGS	Filed
(H) 11-19-76	4 — Petitioner's motion for clarification of the stay of mandate issued on October 8th (m-19)	
(H) 11-29-76	4 — Respondents' motion to extend time to file respond to motion for clarification of the stay of mandate issued on October 8 (m-24)	
(R) 2-17-77	Per Curiam order that the motion of respondents U.S. Nuclear Regulatory Comm. and USA and of intervenors Vermont Yankee Nuclear Power Corp. and Baltimore Gas and Electric Co. is granted and the Clerk is directed to file the response to petitioners' motion for clarification; the petitioners' motion for clarification is denied; CJ Bazelon; Edwards, U.S. CJ for the Sixth Circuit; sitting by designation; and Tamm, CJ	
(R) 2-17-77	4 — Opposition of the intervenor Vermont Yankee Nuclear Power Corp. to the motion of the petitioners "For Clarification of the stay of mandate" (m-27)	
(C) 2-17-77	4 — NRC's response to petitioners' motion for clarification of the stay of mandate (m-Dec. 6) (OK, GF)	

[No. 74-1586]

(L) 6-7-74	4 — Petitioner's petition for review of an order of the AEC (m-7)	
(L) 6-7-74	Certified copy of a petition for review of an order of the AEC was mailed to AEC and the U.S. Attorney General	
(G) 6-27-74	4 — Petitioners' motion to consolidate with No. 74-1385 (m-26)	
(L) 7-5-74	4 — Respondents' opposition to motion to consolidate (m-5)	
(B) 7-8-74	4 — Motion of Baltimire Gas and Electric Company, et al., for leave to intervene (m-8)	
(B) 7-8-74	4 — Opposition of intervenor, Vermont Yankee Nuclear Power Corp., to motion to consolidate (m-8)	
(L) 7-15-74	4 — Supplemental Certificate of Service for filing the petition for review	
(M) 7-17-74	Clerk's order granting motions by Baltimore Gas and Electric Co., Boston Edison Co., Consumers Power Co., Long Island Lighting Co., New England Electric System, Northeast Utilities Co., Pacific Gas & Electric Co., Philadelphia Electric	

DATE	FILINGS — PROCEEDINGS	Filed
	Co., Public Service Electric & Gas Co., San Diego Gas & Electric Co., Southern California Edison Co., Virginia Electric & Power Co., and Yankee Atomic Electric Co., for leave to intervene; counsel for the intervenors are encouraged to file joint briefs whenever practicable and may participate in oral argument only to the extent allowable under Rule 12 of the General Rules of this Court	
(L) 7-17-74	Certified Index to the Record (n-4) (m-17)	
(L) 7-26-74	4 — Petitioners' motion for leave to proceed under Rule 30(c) deferred appendix (m-26)	
(M) 8-2-74	Clerk's order that the parties are granted leave to proceed under Rule 30(c) of the FRAP; in lieu of submitting one copy of the typewritten or page proof brief provided under Rule 30(c) of the FRAP, counsel for the parties shall submit seven copies thereof for filing	
(L) 8-5-74	4 — Intervenor's (Balt. Gas & Electric Co., et al) motion to substitute (4) electric utility companies in place and stead of Intervenor Northeast Utilities Company; (Connecticut Light & Power Company; Hartford Electric Light Company; Western Massachusetts Electric Company; Northeast Nuclear Energy Co.;) and to substitute New England Power Company in place of New England Electric System (m-5)	
(I) 8-16-74	4 — Petitioners' motion to extend time to file brief to 30 days from the date of order granting or denying petitioners' motion to consolidate (m-16)	
(G) 8-22-74	4 — Intervenor's motion for leave to file (Baltimore Gas & Electric Company, et al.) opposition to motion to consolidate nos. 74-1385 and 74-1586 (m-23)	
(M) 8-29-74	Order per Wright ACJ, granting intervenors' (Baltimore Gas & Electric Co., et al) motion to substitute the following four electric utility companies instead of intervenor, Northeast Utilities Co.: *The Connecticut Light & Power Company*; *The Hartford Electric Light Company*; *Western Massachusetts Electric Company*; and *Northeast Nuclear Energy Company*; and intervenors' also move to substitute *New England Power Company* in place of New England Electric System	

DATE	FILINGS — PROCEEDINGS	Filed
(M) 10-3-74	Order per CJ Bazelon denying motions to consolidate; the time for filing petitioners' brief in the appeal is extended to November 2nd; sua sponte, that the Clerk is directed to schedule this case for oral argument on the same day and before the same panel of this Court as appeal No. 74-1385	
(L) 11-4-74	7 — Petitioners' Brief (m-4)	
(G) 11-12-74	4 — Petitioners' motion to correct errors in brief (m-12)	
(M) 11-18-74	Clerk's order granting petitioners' motion to correct errors in brief	
(M) 11-27-74	4 — Respondent's motion to extend time to file brief to February 7th (m-26)	
(M) 11-29-74	4 — Intervenors' Baltimore Gas and Electric Co., et al motion to extend time to file brief to February 7th (m-27)	
(M) 12-4-74	Clerk's order granting respondent's motion to extend time to file brief to Feb. 7th	
(M) 12-5-74	Clerk's order granting intervenors' Baltimore Gas and Electric Co., et al to extend time to file brief to February 7th	
(B) 12-9-74	4 — Motion of Commonwealth Edison Company, et al., for leave to file brief amici curiae (m-9)	
(M) 12-27-74	Order per CJ Bazelon granting motion of Commonwealth Edison Co., et al for leave to file brief amici curiae	
(M) 12-27-74	25 — Brief for Amici Curiae Commonwealth Edison Co., et al (m-9)	
(I) 1-28-75	4 — Respondents' motion to extend time to file brief to March 24th (m-28)	
(G) 2-6-75	4 — Petitioners' opposition to motion to extend time to file brief (m-6)	
(L) 2-10-75	7 — Intervenors' Brief (m-7)	
(R) 2-14-75	Order per CJ Bazelon that the time for filing respondents' brief is extended to March 11, 1975; the time for filing petitioners' reply brief, if any, to respondent and intervenors' briefs is extended for a period of 14 days from the date respondents' brief is filed	

DATE	FILINGS — PROCEEDINGS	Filed
(B) 3-12-75	4 — Respondent's motion for substitution of party (m-12)	
(B) 3-12-75	7 — Respondent's typewritten brief (m-12)	
(R) 3-18-75	Order per Wright ACJ, granting respondents' motion for substitution of party respondent and the Clerk is directed to substitute the U.S.N.R.C. for the U.S.A.E. commission as a party respondent in this case	
(K) 3-26-75	4 — Motion of the State of New York for leave to file brief as Amicus Curiae (Ok RB) (m-20)	
(K) 3-31-75	7 — Petitioners' Reply Brief (m-28)	
(K) 4-7-75	4 — Intervenors' response to motion by State of New York for leave to file amicus curiae brief, time having expired (m-4)	
(K) 4-7-75	4 — Respondents' reply to the State of New York's motion for leave to file brief as amicus curiae (m-4)	
(R) 4-9-75	Order per Wright ACJ, granting motion of the State of New York for leave to file a brief as amicus curiae out of time and the Clerk is directed to file the brief of the state of New York as amicus curiae	
(R) 4-9-75	25 — Amcus curiae brief for State of New York (m-20)	
(K) 4-9-75	4 — Petitioners' motion for leave to correct errata sheet (m-9)	
(K) 4-11-75	7 — Joint Appendix (Volumes I and II) (m-11)	
(R) 4-15-75	Clerk's order granting petitioners' motion for leave to correct errata sheet	
(G) 4-16-75	25 — Petitioners' brief (m-17)	
(G) 4-16-75	25 — Petitioners' reply brief (m-17)	
(R) 4-18-75	Order per Wright ACJ, sua sponte, that the order filed April 9th is amended by adding the following paragraph: Counsel for the parties, if they be so advised, may file answers to the amicus curiae brief within 20 days from the date of this order. Counsel for the parties shall provide 15 copies of their respective answers to the Court for filing	
(K) 4-28-75	15 — Intervenors' Brief (m-25)	

DATE	FILINGS — PROCEEDINGS	Filed
(K) 4-28-75	15 — Respondents' Brief (m-25)	
(G) 5- 8 -75	15 — Intervenor's reply brief to State of New York's amicus curiae brief (m-7)	
(G) 5- 9 -75	15 — Respondents' reply to brief for State of New York as amicus curiae (m-8)	
(R) 5- 8-75	Clerk's order sua sponte, that this appeal is consolidated with appeal no. 74-1385 for oral argument; sua sponte, that the following times are allotted for oral argument; Petitioners in both cases — 30 minutes (to be divided as they see fit) and Respondent — 30 minutes	
(G) 5-14-75	Letter from petitioners' advising of additional authorities pursuant to Local Rule	
(K) 5-15-75	4 — Joint motion for reconsideration of order consolidating oral arguments in Nos. 74-1385 and 74-1586 (m-14)	
(R) 5-22-75	Clerk's order denying motion for reconsideration; the Court will consider extending the time available to each side at argument if circumstances warrant	
(K) 5-22-75	4 — Petitioner's motion for leave to allow three counsel to argue for petitioners (m-22)	
(R) 5-27-75	Argued before CJ Bazelon; George C. Edwards, Jr., CJ for the Sixth Circuit, sitting by designation; and Tamm, CJ'	
(R) 5-27-75	Per Curiam order granting motion for leave to permit three counsel to argue for petitioners; CJ Bazelon; Edwards, U.S. CJ for the Sixth Circuit, sitting by desingation and Tamm, CJ	
(K) 5-29-75	Letter from Petitioner advising of additional authorities pursuant to Local Rule 8(g)	
(K) 6- 3 -75	Letter from Intervenor advising of additional authorities pursuant to Local Rule 8(g)	
(K) 7- 8 -75	Return receipt from George C. Freeman for order of 5/27/75	
(K) 9-24-75	Letter from Petitioner advising of additional authorities pursuant to Local Rule 8(g)	
(H) 1-19-76	3 — Environmental Survey of the Nuclear Fuel Cycle, lodged by appellee, USNRC per DMC	

DATE	FILINGS — PROCEEDINGS	Filed
7-21-76	Opinion for the Court filed by Chief Judge Bazelon.	
7-21-76	Separate statement of Chief Judge Bazelon.	
7-21-76	Separate statement filed by Circuit Judge Tamm, concurring in result.	
7-21-76	Judgment remanding case to the NRC. (n)	
(H) 8- 3 -76	4 — Respondents' motion to extend time to file petition for rehearing and/or suggestion for rehearing en banc to August 25, 1976 (m-2)	
(C) 8- 4 -76	4 — Motion of Baltimore Gas and Electric Co., et al. to extend time to file petition for rehearing to Aug. 25 (m-4)	
(C) 8- 6 -76	4 — Petitioners' opposition to motions to extend time to file petition for rehearing (m-5)	
(C) 8- 6 -76	4 — Petitioners' motion for issuance of mandate forthwith (m-5)	
(C) 8-11-76	4 — Respondents' motion for stay of mandate (m-11)	
(K) 8-20-76	Per Curiam order that the motions of intervenor-appellee Vermont Yankee Nuclear Power Corp., of intervenors Baltimore Gas and Electric Co., et al and respondents NRC and US to extend time to file petitions for rehearing to August 25, 1976 are granted; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit, sitting by designation and Tamm, CJ	
(K) 8-23-76	Per Curiam order that petitioners' motion for issuance of mandate forthwith is denied CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit, sitting by designation and Tamm, CJ	
(K) 8-23-76	Per Curiam order that respondents' US and NRC motion for stay of mandate pending decision on their motion to extend time to file petition for rehearing and/or suggest for rehearing en banc is granted; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit, sitting by designation and Tamm, CJ	
(K) 8-23-76	4 — Respondents' motion for stay of mandate and correction of opinion (m-20) (Ok GF)	
(G) 8-25-76	4 — Petitioners' opposition to motion for stay and correction of opinion (m-24)	

DATE	FILINGS — PROCEEDINGS	Filed
(G) 8-25-76	4 — Intervenors' (Baltimore Gas & Electric Co., et al.) motion for stay of mandate (m-25)	
(C) 8-26-76	4 — Motion of Robert Jeffers, David Hensler, Patrick Raher & George Mayo, Jr., to withdraw as counsel for petitioner NRDC (m-26)	
(G) 8-30-76	Return receipt from counsel for intervenor in No. 74-1586 for certified copy of order filed August 20, 1976	
(G) 9-1-76	4 — Respondents' reply to opposition to motion for stay of mandate (m-30)	
(G) 9-17-76	4 — Respondents' motion for further stay of mandate (m-15)	
(C) 9-23-76	Notice from Clerk, Supreme Court that writ of certiorari was filed on Sept. 21 in SC No. 76-419	
(K)10-7-76	Per Curiam order that the motion of Robert M. Jeffers, David J. Hensler, Patrick M. Raher and George W. Mayo, Jr., to withdraw their appearances as counsel for petition; Natural Resources Defense Council, Inc., is granted; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit, sitting by designation and Tamm, CJ	
(K)10-8-76	Per Curiam order that the Clerk is directed to file the document titled "Stipulation" which had been lodged in the Clerk's Office by petitioners on 8/16/76, and that the motions for stay of mandate are granted, and the Clerk is directed not to issue the mandate herein prior to October 31, 1976, on condition that the United States Nuclear Regulatory Commission shall make any licenses granted between July 21, 1976 and such time when the mandate is issued subject to the outcome of the proceedings herein; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit, sitting by designation and Tamm, CJ	
(K)10-8-76	4 — Stipulation of Petitioners dated 8/16/76	
(K)10-8-76	4 — Petitioner's (in #74-1586) opposition to motion of Intervenor, Baltimore Gas & Electric Co. for stay of mandate (m-7)	
(K)10-8-76	Per Curiam order that respondents' motion for correction of this Court's opinion dated July 21, 1976, is granted in part, and the opinion dated July 21, 1976 is amended as follows: On page 34, delete	

DATE	FILINGS — PROCEEDINGS	Filed
	lines 3-5. On page 34, delete footnote 53 and renumber all succeeding footnotes. On page 41, delete the following from footnote 59: "In this case the board members asked no questions whatsoever of Dr. Pittmann. *See supra* note 53." In all other respects, respondents motion for correction is denied; CJ Bazelon; Edwards, U.S. Circuit Judge for the Sixth Circuit sitting by designation and Tamm, CJ	
(C)10-15-76	Copy of letter from Clerk, Supreme Court extending time to file petition for writ of certiorari in No. A-285 to Nov. 18	
(C)10-26-76	Notice of filing of certiorari in SC No. 76-548 on Oct. 19	
(H)11-8-76	4 — Leter from NRC advising of additional authorities pursuant to Local Rule 8(g)	
(H)11-19-76	4 — Petitioner's motion for clarification of the stay of mandate issued on October 8, 1976 (m-19)	
(H)11-29-76	4 — Respondents' motion to extend time to file response to motion for clarification of the stay of mandate filed on October 8, 1976	
(R) 2-17-77	Per Curiam order that the motion of respondents U.S. Nuclear Regulatory Comm. and USA and of Intervenors Vermont Yankee Nuclear Power Corp. and Baltimore Gas and Electric Co. is granted and the Clerk is directed to file the response to petitioners' motion for clarification; the petitioners' motion for clarification is denied; CJ Bazelon; Edwards, U.S. CJ for the Sixth Circuit, sitting by designation; and Tamm, CJ	
(R) 2-17-77	4 — Opposition to intervenors Baltimore Gas and Electric Co., et al to petitioners' motion for clarification of the stay of mandate (m-6)	
(C) 2-17-77	4 — NRC's response to petitioners' motion for clarification of stay of mandate (m-Dec. 6) (OK, GF)	

[No. 73-1776]

(S) 7-16-73	4 — Petitioners' petition for review of an order of the AEC & US (m-16)	
(S) 7-18-73	Certified copy of petition for review of an order of the AEC mailed to the AEC and to the Attorney General of the United States	

DATE	FILINGS — PROCEEDINGS	Filed
(S) 7-24-73	4 — Motion of Consumers Power Co., for leave to intervene (m-24)	
(S) 8-13-73	4 — Motion of Dow Chemical Co., for leave to intervene (m-10)	
(S) 8-17-73	Certified Index to Record (n-4) (m-17)	
(M) 8-23-73	Clerk's order grantings motions by Consumers Power Company a Michigan Corp., and The Dow Chemical Co., for leave to intervene; counsel for the intervenors may participate in oral argument only to the extent allowable under Rule 12 (c) of the General Rules of this Court	
(S) 9-14-73	4 — Petitioners' motion to extend time to file briefs to October 26th (m-12)	
(S) 9-19-73	4 — Intervenors' (Consumers Power Co.) opposition to motion of Petitioners' to extend time to file briefs (m-18)	
(M) 10-1-73	Order per CJ Bazelon granting petitioners' motion to extend time to file brief and the time for filing a petitioners' brief is extended to October 26, 1973.	
(G) 11-1-73	4 — Motion of intervenor Dow Chemical Co., to extend time to file brief and to file one single brief in this case and No. 73-1867 (m-30)	
(S) 11-8-73	4 — Intervenor's (Dow Chemical Co.) motion to extend time to file brief to January 15th (m-6)	
(M) 11-14-73	Order per CJ Bazelon directing clerk to file petitioners' motion to extend time to file brief in no. 73-1867; time for fling petitioners brief in no. 73-1867 is extended to November 30th; sua sponte, that nos. 73=1776 and 73-1867 are consolidated for all purposes; the intervenor (The Dow Chemical Co) may file its brief on the same date respondents' briefs are due to be filed in this consolidated case	
(M) 11-14-73	4 — Petitioners' motion to extend time to file brief — granted	
(S) 11-14-73	4 — Intervenor's motion to extend time to file brief to January 15th (m-13)	
(S) 11-19-73	4 — Respondent's motion to file single brief for both consolidated cases simultaneously (m-16)	

DATE	FILINGS — PROCEEDINGS	Filed
(M) 11-23-73	Clerk's order granting motion by Consumers Power Co. to extend time to file brief to January 15th and the time for filing intervenors brief is extended to January 15th	
(S) 12-3-73	4 — Petitioners' (Mapleton) motion for leave to file brief, time having expired (m-30)	
(S) 12-5-73	4 — Intervenor's (Consumers Power Co.) response to motion for leave to file brief time having expired (m-4)	
(S) 12-4-73	4 — Respondent's motion for leave to file copy of order to show cause (m-4)	
(I) 12-27-73	4 — Respondents' motion for leave to file memorandum and order (m-26)	
(I) 1-3-74	4 — Intervenor Consumers Power Co., motion to file a single brief (m-2)	
(B) 1-9-74	Clerk's order granting motion of intervenor Consumers Power Co., to file a single brief and time for filing intervenor's brief is extended to 30 days from the date petitioner's brief is filed in no. 73-1867	
(M) 1-11-74	Per Curiam order directing Clerk to file motion by petitioners in 73-1867 to extend time to file brief; petitioners' motion in 73-1776 for leave to file brief is granted; counsel for respondent in the consolidated cases shall file with the Court January 26th, either a notice of decision declining to reopen the proceedings, or a motion to remand the cases for further proceedings in the event it is inclined to grant the motion to reopen the proceeding filed with respondent by petitioners in 73-1867; in the event that the respondent declines to grant the motion to reopen the proceedings, petitioners in 73-1867 shall have 15 days from the date of that decision in which to file their brief, and respondent may file a single brief for both cases which shall be due within 30 days from the date of service of petitioners' brief in 73-1867; Petitioners' in the consolidated cases are granted leave to proceed under Rule 30 (c) of the FRAP, and the parties are encouraged to agree as to the contents of the appendix; the Clerk is directed to file the memorandum and order submitted by respondent; Wright and Robinson, CJ	

DATE	FILINGS — PROCEEDINGS	Filed
(M) 1-11-74	25 — Petitioner's brief (m-3)	
(M) 1-11-74	4 — Memorandum and Order submitted by respondent (m-20)	
(L) 1-25-74	4 —Respondents' decision declining to reopen administrative proceedings (m-24)	
(L) 2-21-74	4 — Respondent's motion for leave to file Supplemental Index (m-20)	
(L) 3- 8 -74	4 — Motion of Intervenor (Dow Chemical Company) for leave to withdraw as intervenor (m-7)	
(B) 3-12-74	Order per CJ Bazelon granting respondent's motion for leave to file supplemental index to record and copies of two Commission Memorandums and Orders dated February 5 and February 20, 1974; Clerk is directed to file the lodged supplemental index to record and copies of two Commission Memorandums and Orders of the aforesaid date	
(B) 3-12-74	Supplemental certified index to record	
(B) 3-12-74	2 — Order to show cause	
(L) 3-21-74	4 — Intervenor's (Consumers Power Company) motion to extend the time to file brief to May 1st (m-21)	
(L) 3-22-74	4 — Respondents' consent motion to extend the time to file brief to May 1st (m-21)	
(M) 3-25-74	Order per CJ Bazelon granting motion of the Dow Chemical Co. for leave to withdraw as an intervenor and the Clerk is directed to make the appropriate notation in the records of his office to reflect the action	
(M) 3-27-74	Clerk's order granting motion to extend time to file brief of respondent and of the Intervenor Consumers Power Co., and the time for filing briefs by respondent and intervenor is extended to May 1, 1974	
(M) 4-19-74	Clerk's order granting motion of the State of Kansas for leave to file brief as amicus curiae beyond the time allowed in case no. 73-1867 and the Clerk is directed to file the brief as amicus curiae	
(M) 4-19-74	25 — Brief amcus curiae for State of Kansas (m-29)	
(L) 5-1-74	7 — Intervenor's (Consumer Power Company) Brief (m-1)	

DATE	FILINGS — PROCEEDINGS	Filed
(L) 5-3-74	7 — Respondent's Brief (m-1)	
(L) 5-10-74	4 — Respondent's motion for leave to file supplemental index to record (m-9)	
(M) 5-30-74	Clerk's order granting respondent's motion for leave to file supplemental index to record	
(M) 5-30-74	Supplemental Certified index to record (m-5)	
(G) 8-23-74	4 — Petitioners' motion for leave to file joint appendix instanter (m-22)	
(M) 9-3-74	Clerk's order granting petitioners' motion for leave to file joint appendix and the Clerk is directed to file petitioners' joint appendix	
(M) 9-3-74	7 — Joint Appendix Vols. I, II, III, IV, V and VA	
(L) 9-6-74	25 — Respondent's Brief (m-29)	
(L) 9-9-74	25 — Intervenor's (Consumers Power Co.) Brief (m-9)	
(G) 10-3-74	4 — Respondents' motion for leave to file a copy of an initial decision of the Atomic Safety and Licensing Board dated September 25, 1974 (m-1)	
(M) 10-18-74	Clerk's order directing the Clerk to lodge all copies of the documents	
(M) 10-18-74	4 — document entitled Petition for reconsideration of an Initial Decision of the A.S.L.B. — LODGED	
(M) 11-27-74	Argued before CJ Bazelon and Fahy, Sr. CJ and William Wayne Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(R) 4-8-75	Per Curiam order sua sponte, that these cases are hereby held in abeyance pending the decision of this Court in Natural Resources Defense Council, Inc. et al v. United States Nuclear Regulatory Commission, et al, No. 74-1586 which will be scheduled for argument on the merits during the May-June sitting period; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(K) 10-20-75	Appearance	
7-21-76	Opinion for the Court filed by Chief Judge Bazelon.	
7-21-76	Judgment remanding case to the Nuclear Regulatory Commission.	

DATE	FILINGS — PROCEEDINGS	Filed
(C) 8-2-76	4 — Intervenor's motion to extend time to file petition for rehearing and/or suggestion for rehearing en banc to Aug. 25 (m-2)	
(H) 8-3-76	4 — Petitioners' motion to extend time to file bill of costs (m-2)	
(H) 8-3-76	4 — Respondents' motion to extend time to file petition for rehearing and/or suggestion for rehearing en banc (m-2)	
(C) 8-4-76	4 — Petitioners' opposition to intervenor's motion to extend time to file petition for rehearing (m-2)	
(G) 8-11-76	4 — Intervenor's (Consumers Power Company) motion to stay issuance of mandate (m-11)	
(C) 8-11-76	4 — Respondents' motion for stay of mandate (m-11)	
(C) 8-11-76	4 — Intervenor's (Consumers Power Co.) motion to stay issuance of mandate (m-11)	
(H) 8-18-76	4 — Petitioners' motion to extend time to file bill of costs (m-17)	
(R) 8-18-76	Per Curiam order that the motions of respondent-intervenor Consumers Power Co. and respondents NRC and USA to stay issuance of mandate during the pendency of there motions to extend the time within which they may file petitions for rehearing are granted; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(R) 8-18-76	Per Curiam order that the motions of respondent-intervenor Consumers Power Co. and of respondents Nuclear Regulatory Comm and USA to extend time within which to file their petitions for reharing and suggestion for rehearing en banc to August 25th is granted; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(R) 8-18-76	Per Curiam order that petitioners' motion to extend time to file their bill of costs is granted; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(C) 8-23-76	4 — Respondents' motion for stay of mandate (m-20)	
(C) 8-23-76	4 — Intervenor's motion for stay of mandate (m-23)	

DATE	FILINGS — PROCEEDINGS	Filed
(G) 8-25-76	4 — Petitioners' opposition to further motions to stay mandate of Nuclear Regulatory Commission and Consumers Power Company (m-24)	
(K) 8-31-76	Per Curiam order that petitioners' amended joint motion to extend time to file bill of costs is granted and the time within which they may file their bill of costs is extended for a period of 10 days after entry of orders ruling upon any petitions for rehearing and/or suggestions for rehearing en banc in these cases or for a period not to exceed 10 days after the date of this order in the event no such petitioners or suggestions are filed; CJ Bazelon; Fahy, Senior CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(G) 9-1-76	4 — Respondents' reply to opposition to motion for stay of mandate (m-31)	
(G) 9-1-76	4 — Intervenor's (Consumers Power Co.) reply to opposition to motion for stay of mandate (m-1)	
(R) 9-2-76	Per Curiam order that the motions of respondents and intervenor for stay of mandate are denied; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
9-3-76	Certified copy of opinion and judgment issued to the NRC.	
(G) 9-10-76	4 — Petitioners' consolidated bill of costs (m-8)	
(C) 10-15-76	Copy of letter from Clerk, Supreme Court extending time to file petition for writ of certiorari in No. A-285 to Nov. 18	
(C) 10-20-76	Notice from Supreme Court that petition for certiorari was filed in SC No. 76-528 on Oct. 15	

[No. 73-1867]

(S) 8-9-73	4 — Petitioners' petition for review of an order of the AEC (m-6)	
(S) 8-9-73	Certified copy of Petitioners' petition for review of an order of the AEC mailed to the AEC and the US Attorney General	
(S) 8-13-73	4 — Motion of Consumers Power Co., for leave to intervene (m-10)	

DATE	FILINGS — PROCEEDINGS	Filed
(M) 8-17-73	Certified Index to Record (n-2)	
(M) 9-7-73	Clerk's order directing Clerk to file the motion by The Dow Chemical Company for leave to intervene herein; the motion for leave to intervene is granted and counsel for the intervenor may participate in oral argument only to the extent allowable under Rule 12 of the General Rules of this Court	
(M) 9-7-73	4 — Notice of intervention and motion for leave to intervene of the Dow Chemical Co. granted	
(B) 9-7-73	Clerk's order granting motion by Consumers Power Company, a Michigan Corporation, for leave to intervene; Counsel for intervenor may participate in oral argument only to the extent allowable under Rule 12 (c) of the General Rules of this Court	
(B) 9-7-73	4 — Petitioner's opposition to motion for leave to intervene of Dow Chemical Company (m-7)	
(G) 9-24-73	4 — Petitioners' motion for leave to file motion to extend time to file brief and appendix (m-20)	
(B) 9-28-73	4 — Response of intervenor Consumers Power Company in opposition to motion to dispense with filing appendix (m-28)	
(B) 9-28-73	4 — Motion of intervenor Consumers Power Company to proceed under Rule 30 (c) of FRAP (m-28)	
(G) 10-1-73	4 — Intervenor's (Dow Chemical Company) response to motion for extension of time to file brief and to dispense with filing of appendix (m-28)	
(B) 10-10-73	Order per CJ Bazelon directing Clerk to file petitioners' motion to extend time to file brief and appendix and time for filing is extended to October 29th; further ordered motion for leave to proceed under provisions of Rule 30 (c) of FRAP is granted denying motion to dispense with filing of appendix without prejudice to its being renewed after the exchange of designations and the filing of briefs as provided under Rule 30 of the FRAP; in lieu of submitting one copy of the typewritten or page proof brief provided under Rule 30 (c) of the FRAP, counsel for the parties shall submit seven copies thereof for filing	

DATE	FILINGS — PROCEEDINGS	Filed
(B) 10-10-73	4 — Petitioners' motion to extend time to file brief and appendix — granted	
(G) 10-29-73	4 — Petitioners' motion for leave to file motion to extend time to file brief (m-26)	
(G) 10-30-73	4 — Motion of Consumers Power Company to extend time to file brief to January 15, 1974 (m-29)	
(G) 11-1-73	4 — Intervenor's (Dow Chemical Co.) response to petitioners' motion to extend time to file brief (m-30)	
(B) 11-2-73	Clerk's order granting motion of Consumers Power Company, Intervenor, to extend time to file brief to January 15, 1974	
(M) 11-14-73	Order per CJ Bazelon directing the clerk to file petitioners' motion to extend time to file brief in this case; time for filing petitioners' brief in this case is extended to November 30th; sua sponte, that nos. 73-1776 and 73-1867 are consolidated for all purposes; intervenor (The Dow Chemical Co) may file its brief on the same date respondents' briefs are due to be filed in the consolidated cases	
(M) 11-14-73	4 — Petitioners' motion to extend time to file brief — granted	
(S) 11-19-73	4 — Respondent's motion to file single brief for both consolidated cases simultaneously (m-16)	
(G) 11-23-73	4 — Petitioners' motion for leave to file motion to extend time to file brief (m-20)	
(G) 11-27-73	4 — Intervenor's (Consumers Power) opposition to motion of petitioners to extend time to file brief (m-27)	
(G) 11-27-73	4 — Respondents' response to petitioners motion for extension of time to file brief (m-26)	
(G) 11-30-73	4 — Petitioners' reply to intervenors opposition to motion for extension of time and reply to respondents response to motion to extend time (m-28)	
(I) 12-27-73	4 — Respondents' motion for leave to file memorandum and order (m-26)	
(I) 12-4-73	4 — Respondents' motion for leave to file copy of order to show cause (m-4)	
(I) 1-3-74	4 — Motion of Consumers Power Co., to file a single brief (m-2)	

DATE	FILINGS — PROCEEDINGS	Filed
(B) 1-9-74	Clerk's order granting motion of intervenor Consumers Power Co., to file a single brief and time for filing intervenor's brief is extended to 30 days from the date petitioner's brief is filed in no. 73-1867	
(M) 1-11-74	Per Curiam order directing the Clerk to file the motion by petitioners in No. 73-1867 to extend time to file brief; granting petitioners' motion in no. 73-1776 for leave to file brief; counsel for respondent in the consolidated cases shall file with the Court by January 26th either a notice of its decision declining to reopen the proceedings, or a motion to remand the cases for further proceedings in the event it is inclined to grante the motion to reopen the proceeding filed with respondent by Petitioners in 73-1867; in the event the respondent declines to grant the motion to reopen the proceedings, petitioners in 73-1867 shall have 15 days from the date of that decision in which to file their brief and respondent may file a single brief for both cases which shall be due within 30 days from the date of service of petitioners' brief in 73-1867; petitioners' in the consolidated cases are granted leave to proceed under Rule 30 (c) of the FRAP, and the parties are encourged to agree as to the contents of the appendix; the Clerk is directed to file the memorandum and order submitted by respondent; Wright and Robinson, CJ	
(M) 1-11-74	4 — Petitioners' motion to extend time to file petitioners' brief — granted	
(M) 1-11-74	4 — Memorandum and Order submitted by Respondent (m-20)	
(1) 1-25-74	4 — Respondents' decision declining to reopen administrative proceedings (m-24)	
(G) 2-11-74	4 — Petitioners' motion for leave to file motion to extend time to file brief (m-6)	
(B) 2-14-74	Clerk's order granting petitioners' motion for leave to file motion to extend time to file brief; and extending time to February 25th	
(B) 2-14-74	4 — Petitioners' motion to extend time to file brief — granted	
(L) 2-21-74	4 — Respondent's motion for leave to file Supplemental Index (m-20)	

DATE	FILINGS — PROCEEDINGS	Filed
(G) 2-27-74	25 — Petitioners' brief (m-25)	
(L) 3-8-74	4 — Motion of Dow Chemical Company for leave to withdraw as Intervenor (m-7)	
(B) 3-12-74	Order per CJ Bazelon granting respondent's motion for leave to file supplemental index to record and copies of two Commission Memorandums and Orders of the aforesaid date	
(B) 3-12-74	Supplemental certified index to record	
(B) 3-12-74	2 — Order to show cause	
(L) 3-21-74	4 — Intervenor's (Consumers Power Company) motion to extend the time to file brief to May 1st (m-21)	
(L) 3-22-74	4 — Respondents' consent motion to extend the time to file brief to May 1st (m-21)	
(M) 3-25-74	Order per CJ Bazelon granting motion for the Dow Chemical Co., for leave to withdraw as an intervenor and the Clerk is directed to make the appropraite notations in the records of his office to reflect this action	
(M) 3-27-74	Clerk's order granting motion to extend time to file brief of respondent and of the Intervenor, Consumer Power Co., and the time for filing briefs by respondent and intervenor is extended to May 1, 1974	
(G) 4-3-74	4 — Motion of The State of Kansas, for leave to file brief as amicus curiae beyond time allowed petitioners in this case (m-29)	
(M) 4-19-74	Clerk's order granting motion of the State of Kansas for leave to file brief as amicus Curiae beyond time allowed petitioners in this case and the Clerk is directed to file the brief as amicus curiae	
(M) 4-19-74	25 — Brief ameiuse curiae for State of Kansas (m-29)	
(L) 5-1-74	7 — Intervenor's (Consumer Power Company) Brief (m-1)	
(L) 5-3-74	7 — Respondent's Brief (m-1)	
(L) 5-10-74	4 — Respondent's motion for leave to file supplemental index to record (m-9)	

DATE	FILINGS — PROCEEDINGS	Filed
(G) 5-17-74	4 — Petitioners' motion for leave to file motion to extend time to file a reply brief (m-15)	
(B) 5-23-74	Clerk's order granting petitioner's motion for leave to file motion to extend time to file reply brief; and extending time to May 20th	
(B) 5-23-74	4 — Petitioner's motion to extend time to file reply brief — granted	
(G) 5-22-74	4 — Petitioners' motion for leave to file motion to extend time to file reply brief (m-20)	
(G) 5-22-74	4 — Petitioners' renewed motion to dispense with filing of the appendix (m-20)	
(G) 5-24-74	4 — Intervenor's (Consumers Power Co.) response to renewed motion to dispense with filing of the appendix (m-24)	
(G) 5-28-74	4 — Respondents' opposition to motion to dispense with filing of the appendix (m-23)	
(G) 5-28-74	4 — Petitioners' motion for leave to file reply brief in excess of 35 pages (m-26)	
(G) 5-28-74	4 — Petitioners' motion for leave to file reply brief, time having expired (m-26)	
(M) 5-30-74	Clerk's order granting respondents motion for leave to file supplemental index to record	
(M) 5-30-74	Supplemental certified index to record (n-5),	
(B) 5-31-74	Clerk's order granting petitioners' motion for leave to file motion to extend time to file reply brief; and extending time to May 24th	
(B) 5-31-74	4 — Petitioners' motion for leave to extend time to file brief — granted	
(B) 5-31-74	Clerk's order granting petitioners' motion to file reply brief, time having expired	
(B) 6-17-74	Per Curiam order denying petitioner's motion for leave to file reply brief in excess of page limitations; further ordered by the Court, denying petitioner's motion to dispense with appendix; Tamm and Leventhal, CJ	
(G) 6-21-74	4 — Petitioners' motion for leave to file reply brief, time having expired (m-20)	

DATE	FILINGS — PROCEEDINGS	Filed
(M) 6-27-74	Clerk's order granting petitioners' motion for leave to file reply brief, time having expired and the Clerk is directed to file petitioners reply brief	
(M) 6-27-74	25 — Petitioners' reply brief (m-20)	
(G) 8-23-74	4 — Petitioners' motion for leave to file joint appendix instanter (m-22)	
(M) 9-3-74	Clerk's order granting petitioners' motion for leave to file joint appendix and the Clerk is directed to file petitioners' joinnt appendix	
(M) 9-3-74	7 — Joint Appendix vols. I, II, III, IV, V and VA	
(L) 9-6-74	25 — Respondent's Brief (m-29)	
(L) 9-9-74	25 — Intervenor's (Consumer Power Co.) Brief (m-9)	
(G) 10-3-74	4 — Respondents' motion for leave to file a copy of an initial decision of the Atomic Safety and Licensing Board dated September 25, 1974 (m-1)	
(L) 10-8-74	4 — Petitioners' motion for leave to file a copy of the petition for reconsideration of initial decision of the Atomic Safety and Licensing Board dated Sept. 25, 1974 (m-30)	
(M) 11-27-74	Argued before C J Bazelon and Fahy, Sr. CJ and William Wayne Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(R) 10-18-74	Clerk's order directing the Clerk to lodge all copies of the documents	
(R) 10-18-74	4 — Document entitled Petition for reconsideration of an Initial Decision of the A.S.L.B. — LODGED	
(R) 4-8-75	Per Curiam order sua sponte, that these cases are hereby held in abeyance pending the decision of this Court in Natural Resources Defense Council, Inc., et al v. United States Nuclear Regulatory Commission, et al no. 74-1586 which will be scheduled for argument on the merits during the May-June sitting period; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
	7-21-76 Opinion for the Court filed by Chief Judge Bazelon.	
	7-21-76 Judgment remanding case to the Nuclear Regulatory Commission. (n)	

DATE	FILINGS — PROCEEDINGS	Filed
(C) 8-2-76	4 — Intervenor's motion to extend time to file petition for rehearing and/or suggestion for rehearing to Aug. 25 (m-2)	
(H) 8-3-76	4 — Petitioners' motion to extend time to file bill of costs (m-2)	
(H) 8-3-76	4 — Respondents' motion to extend time to file petition for rehearing and/or suggestion for rehearing en banc to August 25, 1976 (m-2)	
(C) 8-4-76	4 — Petitioners' opposition to intervenor's motion to extend time to file petition for rehearing (m-2)	
(G) 8-11-76	4 — Intervenor's (Consumers Power Company) motion to stay issuance of mandate (m-11)	
(C) 8-11-76	4 — Respondents' motion for stay of mandate (m-11)	
(C) 8-11-76	4 — Intervenor's (Consumers Power Co.) motion to stay issuance of mandate (m-11)	
(H) 8-18-76	4 — Petitioners' motion to extend time to file bill of costs (m-17)	
(R) 8-18-76	Per Curiam order that the motions of respondent-intervenor Consumers Power Co. and of respondents NRC and USA to stay issuance of the mandate during the pendency of their motions to extend the time within which they may file petitions for rehearing are granted; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(R) 8-18-76	Per Curiam order that the motions of respondent-intervenor Consumers Power Co. and of respondents NRC and USA to extend the time within which to file their respective petitions for rehearing and suggestions for rehearing en banc to August 25th are granted; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation.	
(R) 8-18-76	Per Curiam order that petitioners' motion to extend time within which to file their bill of costs is granted; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(C) 8-23-76	4 — Respondents' motion for stay of mandate (m-20)	

DATE	FILINGS — PROCEEDINGS	Filed
(C) 8-23-76	4 — Intervenor's motion for stay of mandate (m-23)	
(G) 8-25-76	4 — Petitioners' opposition to further motions to stay mandate of Nuclear Regulatory Commission and Consumers Power Company (m-24)	
(K) 8-31-76	Per Curiam order that petitioners' amended joint motion to extend time to file bill of costs is granted and the time within which they may file their bill of costs is extended for a period of 10 days after entry of orders ruling upon any petitioners for rehearing and/or suggestions for rehearing en banc in these cases or for a period not to exceed 10 days after the date of this order in the event no such petitioners or suggestions are filed; CJ Bazelon; Fahy, Senior CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
(G) 9-1-76	4 — Respondents' reply to opposition to motion for stay of mandate (m-31)	
(G) 9-1-76	4 — Intervenor's (Consumers Power Co.) reply to opposition to motion for stay of mandate (m-1)	
(R) 9-2-76	Per Curiam order that the motions of respondent and intervenor for stay of mandate are denied; CJ Bazelon; Fahy, Sr. CJ and Justice, U.S. District Judge for the Eastern District of Texas, sitting by designation	
9-3-76	Certified copy of judgment and opinion issued to NRC.	
(C) 9-10-76	4 — Petitioners' consolidated bill of costs (m-8)	
(C) 10-15-76	Copy of letter from Clerk, Supreme Court extending time to file petition for writ of certiorari in No. A-285 to Nov. 18	
(C) 10-20-76	Notice from Supreme Court that petition for certiorari was filed in SC No. 76-528 on Oct. 15	

Notice: This opinion is subject to formal revision before publication in the Federal Reporter or U.S. App. D.C. Reports. Users are requested to notify the Clerk of any formal errors in order that corrections may be made before the bound volumes go to press.

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 74-1385

NATURAL RESOURCES DEFENSE COUNCIL, INC., ET AL, PETITIONER

v.

UNITED STATES NUCLEAR REGULATORY COMMISSION AND UNITED STATES OF AMERICA, RESPONDENTS

VERMONT YANKEE NUCLEAR POWER CORPORATION, INTERVENOR

No. 74-1586

NATURAL RESOURCES DEFENSE COUNCIL, INC., AND CONSOLIDATED NATIONAL INTERVENORS, PETITIONERS

v.

UNITED STATES NUCLEAR REGULATORY COMMISSION AND UNITED STATES OF AMERICA, RESPONDENTS

BALTIMORE GAS AND ELECTRIC CO., ET AL., INTERVENORS

Petition for Review of an Order of the Nuclear Regulatory Commission

---

Argued May 27, 1975

Decided July 21, 1976

George W. Mayo, Jr., with whom *Robert M. Jeffers*, *David J. Hensler*, *Patrick M. Raher*, *Richard E. Ayres* and *Anthony Z. Roisman*, were on the brief for petitioners in No. 74-1385.

David Hensler and *Patrick M. Raher*, with whom *Robert M. Jeffers*, *George W. Mayo, Jr.*, *Richard E. Ayres* and *Anthony Z. Roisman*, were on the brief for petitioners in No. 74-1586.

James A. Glasgow, Attorney, U.S. Nuclear Regulatory Commission, with whom *Wallace H. Johnson*, Assistant Attorney General, *Edmund B. Clark*, *John J. Zimmerman*, Attorneys, Department of Justice, *Raymond M. Zimmet*, Acting Solicitor, U.S. Nuclear Regulatory Commission, were on the brief for respondents. *Marcus A. Rowden*, *Jerome Nelson*, *Joseph DiStefono* and *Guy H. Cunningham, III*, Attorneys, U.S. Nuclear Regulatory Commission and *George R. Hyde* and *Edward J. Shawaker*, Attorneys, Department of Justice, also entered appearances for respondents.

George C. Freeman, Jr., with whom *W. Taylor Reveley, III*, *David S. Brollier* and *F. Case Whitlemore* were on the brief for intervenor, Baltimore Gas and Electric Company in No. 74-1586.

Thomas G. Dignan, Jr., for intervenor, Vermont Yankee Nuclear Power Corporation in No. 74-1385.

Louis J. Lefkowitz, Attorney, General of the State of New York and *John F. Shea, III*, Assistant Attorney General of the State of New York filed a brief on behalf of the State of New York as *amicus curiae*.

Arvin E. Upton, *Harry H. Voight* and *Eugene R. Fidell*, Filed a brief on behalf of Commonwealth Edison Company, Consolidated Edison Company of New York, Inc., Niagara Mohawk Power Corporation, Omaha Public Power District Powers Authority of the State of New

York and Rochester Gas and Electric Corp., as *amici curiae* urging affirmance.

Before: BAZELON, *Chief Judge*, EDWARDS,* *Circuit Judge* for the Sixth Circuit and TAMM, *Circuit Judge*

Opinion for the Court filed by *Chief Judge* BAZELON.

Separate statement of *Chief Judge* BAZELON.

Separate statement filed by *Circuit Judge* TAMM, concurring in the result.

BAZELON, *C.J.*: The problems posed in both these cases relate to the manner and extent to which information concerning the environmental effects of radioactive wastes must be considered on the public record in decisions to license nuclear reactors.

I. INTRODUCTION

Appeal number 74-1385 involves a proceeding to license a specific nuclear reactor (the Vermont Yankee Nuclear Power Station located near Vernon, Vermont). Pursuant to the National Environmental Policy Act,[1] petitioners[2]

---

* Sitting by designation pursuant to 28 U.S.C. § 291(a).

[1] 42 U.S.C. § 4321, *et seq.* (1970) (hereafter "NEPA").

[2] Petitioners in 74-1385 are the Natural Resources Defense Council, Inc. ("NRDC") and the New England Coalition on Nuclear Pollution, Inc., voluntary organizations supported by contributions from individual members, which intervened in the licensing proceedings.

NRDC is also a petitioner in 74-1586, where it is joined by Consolidated National Intervenors, Inc. ("CNI"), a coalition of almost eighty public interest groups and individuals which actively participated in the rule making proceedings. Several groups such as the Sierra Club and the Union of Concerned Scientists which are members of CNI also made individual presentations.

[Continued]

sought consideration of the environmental effects of that portion of the "nuclear fuel cycle" [3] attributable to operation of that reactor. The Appeal Board held that Licensing Boards [4] must consider the environmental effects of trans-

---

Since on all but a few issues these groups adopted the same positions, for convenience they are referred to collectively as "public interest intervenors" in order to distinguish them from a group of 14 utility companies which also actively participated in the rulemaking. One member of that group, Baltimore Gas & Electric Co., has also intervened in the proceedings in this court.

[3] The "nuclear fuel cycle" is that chain of activities beginning with mining of uranium ore and extending through final reprocessing and disposal of radioactive wastes by which fuel for a nuclear reactor is processed. Most of these events take place off the individual reactor site, but are necessary to its continued operation.

Although the nuclear fuel cycle encompasses numerous stages, these cases are concerned almost exclusively with the reprocessing and disposal of wastes which the public interest intervenors contend account for by far the largest portion of the environmental impact of the fuel cycle.

The word *disposal* may itself be misleading, for it connotes some physical or chemical step which renders the wastes less toxic. Under present technology, the only known agent of detoxification is the passage of great amounts of time. The phase of the nuclear fuel cycle referred to as "disposal" generally refers only to storage of wastes in physical isolation.

[4] Licensing of commercial nuclear reactors embraces two separate proceedings—the first to determine whether the facility should be constructed; the second to determine whether it should be licensed to operate. *See generally*, Power Reactor Development Corp. v. I.U.E.W., 367 U.S. 396 (1961).

Proceedings are conducted before a three-member Atomic Safety and Licensing Board, 42 U.S.C. § 2241, which is the counterpart of an Administrative Law Judge in other agencies. The Licensing Board is typically composed of two nuclear physicists and one lawyer who serves as chairman.

[Continued]

portation of fuel to a reactor and of wastes to reprocessing plants, but need not consider the "operations of the reprocessing plants or the disposal of wastes" in individual licensing proceedings. *In re Vermont Yankee Nuclear Power Corp.*, ALAB-56, 4 AEC 930 (June 6, 1972), I-J.A. 72, 76.[5]

Appeal number 74-1586 involves a rulemaking proceeding which the Commission instituted shortly thereafter with specific reference to the *Vermont Yankee* decision. The purpose of the rulemaking was to reconsider whether environmental effects of all stages of the uranium fuel cycle should be included in the cost-benefit analysis for licensing individual reactors. 37 Fed.Reg. 24191 (Nov. 15, 1972), II-J.A. 1. The Commission concluded the environmental effects of the fuel cycle, including waste disposal, were "relatively insignificant,"[6] but that it was preferrable to take them into account. Therefore, a rule was promulgated requiring a series of specified numerical values (set out as Table S-3 accompanying the rule) be factored into the cost-benefit analysis

---

The Atomic Energy Commission ("AEC") has delegated its review functions over Licensing Board decisions to Atomic Safety and Licensing Appeal Boards, subject to discretionary determination by the AEC itself of "major or novel questions of policy, law or procedure." 10 C.F.R. § 2.785(a); *id.* (d)(1).

The AEC was abolished by the Energy Reorganization Act of 1974, 88 Stat. 1233 *et seq.*, and its functions divided between the United States Nuclear Regulatory Commission (NRC), which has been substituted as formal respondent by order of this court, and the Energy Research and Development Agency (ERDA). For consistency, the terminology AEC or "the Commission" is used throughout.

[5] References to the joint appendix in 74-1385 are in the form "I-J.A." Both volumes of the appendix in 74-1586 are referred to as "II-J.A."

[6] *See infra* note 19.

for an individual reactor. These values are intended to represent the incremental contribution of an additional reactor to the environmental effect of the fuel cycle. The rule further provides that in addition to Table S-3, "No further discussion of such environmental effects shall be required."[7] Finally, it is declared that "[i]nsofar as this rule differs" from that announced in the *Vermont Yankee* decision, *supra*, that decision shall have "no further precedential significance." *Id.*

II. Vermont Yankee (74-1385)

It is undisputed that a reactor licensing is a "major Federal action[] significantly affecting the quality of the human environment" which requires a "detailed" environmental impact statement under § 102(2)(C) of NEPA, 42 U.S.C. § 4332(2)(C). That section requires an impact statement to consider, *inter alia*,

> (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
>
> * * * *
>
> (v) any irreversible and irretriveable commitments of resources which would be involved in the proposed action should it be implemented.

The plain meaning of this language encompasses radioactive wastes generated by the operations of a nuclear power station, just as it does the stack gases produced by a coal-burning power plant.

Nor are the wastes generated by the subject reactor *de minimis*. We were informed at argument that the Vermont Yankee plant will produce approximately 160 pounds of plutonium wastes annually during its 40-year

---

[7] 39 Fed.Reg. 14188, 14191 (April 22, 1974), II-J.A. 507, 509. The rule is codified as Part 51.20(e) of 10 C.F.R. (1975) in a section entitled "Applicant's Environmental Report—Construction Permit Stage."

life span.[8] Plutonium is generally accepted as among the most toxic substances known; inhalation of a single microscopic particle is thought to be sufficient to cause cancer.[9] Moreover, with a half-life of 25,000 years, plutonium must be isolated from the environment for 250,000 years before it becomes harmless. Operation of the facility in question will also produce substantial quantities of other "high-level" [10] radioactive wastes in the form of stron-

[8] There has been some disagreement between the parties concerning the exact amounts of wastes to be produced. We are required to consider projects from the perspective of their potential effect on the "quality of the human environment." 42 U.S.C. § 4332(2)(C). Since plutonium and other high level wastes may be toxic in extremely small quantities, these variances are not of an order which would affect our conclusions.

[9] *See* Luschbauch & Langham, *A Dermal Lesion from Implanted Plutonium*, 86 ARCHIVES OF DERMATOLOGY at 121-24 (Oct. 1962).

The dangers of plutonium must be kept in perspective. Certain industrial chemicals and substances common in laboratories may be equally toxic. B. Cohen, *Environmental Hazards in High-Level Radioactive Waste Disposal*, 2 (unpublished). Recent theoretical calculations suggest many would survive even intentional dispersal of plutonium over a city. B. Cohen, *The Hazards in Plutonium Dispersal*, Institute for Energy Analysis, Oak Ridge, Tenn. (1975). *See also* Bethe, *The Necessity of Fission Power*, 234 SCIENTIFIC AMERICAN 21, 29 (1976).

[10] According to a pamphlet published by the AEC's office of Information to inform the general public, "high-level" wastes consist primarily of highly radioactive spent reactor fuel containing "several hundred to several thousand curies per gallon in liquid form . . . ." Fox, *Radioactive Waste*, AEC No. IB-508, 14-15 (rev. ed. 1969). They "pose the most severe potential health hazard and the most complex technical problems in management," *id.*, and thus attracted the bulk of the attention in these proceedings.

Less radioactive "low-level" wastes are also produced, primarily when objects such as pipes, rags or other debris are exposed to radioactivity produced in the reactor core. Low-

tium-90 and cesium-137 which, with their shorter, 30-year half-lives, must be isolated from the environment for "only" 600 to 1000 years.[11]

The Appeal Board advanced two major arguments to justify its decision that reprocessing and waste disposal issues need not be considered at the licensing stage: (1) that these issues are too speculative; and (2) that they are more appropriately considered when reprocessing and waste disposal facilities are themselves licensed. We turn now to these contentions.

The Board agreed that "there will be an incremental environmental effect ultimately resulting from the operation of this reactor as the result of the operation of whatever reprocessing and disposal grounds may from time to time be used during the life of the plant." [12] In its opin-

level wastes have long been disposed of in commercial burial grounds and were thought not to constitute a major problem. Recently, however, EPA and GAO have publicly reported radioactive material has been "migrating" from such facilities at a rate "much more rapid than scientists thought possible." *See* "New Alarms About Old Nuclear Wastes," BUSINESS WEEK (Feb. 2, 1976) at 17; "GAO Reports New Nuclear Garbage Problem," 6 SCIENCE & GOV. RPT. 8 (Feb. 1, 1976).

[11] The general outlines of the high-level waste disposal problem are undisputed. In Scientists' Institute for Public Information, Inc. v. AEC (*"SIPI"*), 156 U.S.App.D.C. 395, 481 F.2d 1079, 1098 (1973), this court observed:

> These wastes will pose an admitted hazard to human health for hundreds of years, and will have to be maintained in special repositories. *The environmental problems attendant upon processing, transporting and storing these wastes . . . warrant the most searching scrutiny under NEPA.* [Emphasis added.]

[12] I-J.A. 80. We note at the outset that this standard is misleading because the toxic life of the wastes under discussion far exceeds the life of the plant being licensed. The

ion, however, these effects were too "contingent and presently indefinable" to be evaluated at the time of licensing in view of the 40-year expected life of the reactor. The Board wrote:

> It is evident to us that evaluation of the environmental effects of the operation of one or more unidentifiable reprocessing plants, employing separation processes which are unidentified and which may or may not now be known or used, during the course of the forty-year life of the plant, is not possible at this time and in this proceeding.

I-J.A. 82. This approach was decisively rejected in *SIPI*, supra, note 11, 481 F.2d at 1092. There we held that the obligation to make reasonable forecasts of the future is implicit in NEPA and therefore an agency cannot "shirk [its] responsibilities under NEPA by labeling any and all discussion of future environmental effects as 'crystal ball inquiry.'" "Meaningful information" concerning the effects of waste reprocessing and disposal technology is presently available, *see SIPI*, 481 F.2d at 1094, 1096. As the Board noted, a reprocessing plant has been operated by the Commission for some time, and additional plants are under construction. I-J.A. 79. The possibility that

---

environmental effects to be considered are those flowing from reprocessing and passive storage for the full detoxification period.

It is also misleading to focus solely on the *incremental* impact of the waste generated by an additional reactor. *See* NRDC v. Callaway, 524 F.2d 79, 88 (2d Cir. 1975):

> [A]n agency may not . . . treat[] a project as an isolated "single-shot" venture in the face of persuasive evidence that it is but one of several substantially similar operations. . . . To ignore the prospective cumulative harm under such circumstances could be to risk ecological disaster.

See also Kleppe v. Sierra Club, 44 U.S.L.W. 5104, 5109 (U.S., June 28, 1976) (Comprehensive EIS should address cumulative impact of proposals "pending concurrently"); *cf. id.* at 5111 n.26.

improved technology may be developed during the 40-year life span of a reactor does not render consideration of environmental issues too speculative, as the Board appears to suggest. NEPA's requirement for forecasting environmental consequences far into the future implies the need for predictions based on existing technology and those developments which can be extrapolated from it.[18]

As more and more reactors producing more and more waste are brought into being, "irretrievable commitments [are] being made and options precluded," *see SIPI*, 481 F.2d at 1094, 1098, and the agency must predict the environmental consequences of its decisions as it makes them. *See Aberdeen & Rockfish R.R. v. SCRAP*, 422 U.S. 289, 320 (1975).

The second argument advanced by the Board is that licensing proceedings for reprocessing plants are a more "appropriate proceeding" in which to weigh the environmental effects of reprocessing and waste disposal. I-J.A. 86. Licensing of a reprocessing plant or waste disposal facility is itself a "major Federal action" affecting the environment which requires a NEPA statement. The real question posed by the Board's opinion is whether the environmental effects of the wastes produced by a

---

[18] Technical breakthroughs not now foreseen may of course render these assumptions too conservative, and environmental costs may turn out to be less than expected. The alternative is to rest on a blind faith in technological progress. This the draftsmen of NEPA were quite evidently unwilling to do.

Conversely, unforeseen problems sometimes crop up to forestall anticipated technological solutions. *See, e.g., infra* notes 46 & 47. Where important changes in the state of the art or other major uncertainties are in the offing, meaningful assessments of future environmental impacts might be facilitated by making two alternative estimates: one based only on existing technology and another which takes into account developments which may reasonably be anticipated. We have no occasion in this case to decide whether a court could ever require such a procedure.

nuclear reactor may be ignored in deciding whether to build it because they will later be considered when a plant is proposed to deal with them. To answer this question any way but in the negative would be to misconstrue the fundamental purpose of NEPA.[14] Once a series of reactors is operating, it is too late to consider whether the wastes they generate should have been produced, no matter how costly and impractical reprocessing and waste disposal turn out to be; all that remain are engineering details to make the best of the situation which has been created.[15] NEPA's purpose was to break the cycle of such incremental decision-making:

[14] *Cf.* Calvert Cliffs' Coordinating Comm. v. AEC, 449 F.2d 1109, 1128 (D.C.Cir. 1971). There the Commission proposed to forestall consideration of environmental issues in granting reactor construction permits until an operating license was issued. This court pointed out: "Once a facility has been completely constructed, the economic cost of any alteration may be very great . . . . By refusing to consider requirement of alterations until construction is completed, the Commission may effectively foreclose the environmental protection desired by Congress."

[15] Intervenor Baltimore Gas & Electric Co. contended at argument "however broad NEPA may be, it does not require agencies like the AEC, ICC or CAB to examine in the impact statement the very reason for being of that agency." We have already rejected that argument in Natural Resources Defense Council v. Morton, 458 F.2d 827, 836 (D.C.Cir. 1972): "The need for continuing review of environmental impact of alternatives under NEPA cannot be put to one side on the ground of past determinations by Congress or the President." *See also* Calvert Cliffs' Coordinating Comm. v. AEC, *supra* note 14, 449 F.2d at 1127. One function of NEPA is to provide systematic feedback to Congress and the public on the environmental costs of implementing programs so that they may be re-evaluated in the light of experience.

Moreover, the "reason for being" of the agencies administering the Atomic Energy Act of 1954 has never been unlimited development of civilian nuclear power without re-

> Policy is established by default and inaction. Environmental problems are only dealt with when they reach crisis proportion . . . . Important decisions concerning the use and shape of man's environment continue to be made in small but steady increments which perpetuate rather than avoid the recognized mistakes of previous decades.

Senate Rep. No. 296, 91st Cong., 1st Sess. 5 (1969). Decisions to license nuclear reactors which generate large amounts of toxic wastes requiring special isolation from the environment for several centuries are a paradigm of "irreversible and irretrievable commitments of resources" which must receive "detailed" analysis under § 102(2)(C)(v) of NEPA, 42 U.S.C. § 4332(2)(C)(v).[16] We therefore hold that absent effective generic proceedings to consider these issues, they must be dealt with in individual licensing proceedings.[17]

gard to the costs or risks. The Congressionally declared purpose is only to "encourage widespread participation in the development and utilization of atomic energy for peaceful purposes *to the maximum extent consistent with . . . the health and safety of the public.*" 42 U.S.C. § 2013(d) (1970) [emphasis added].

[16] No one suggests that the two sentence statement in the Vermont Yankee Final Environmental Impact Statement is adequate to satisfy § 102(2)(c). It reads:

> Long-lived radioactive materials will be produced by fission of nuclear fuel in the core of the reactor and neutron activation of reactor parts near the core. The eventual disposal and storage of radioactive materials will require a certain amount of space, probably in an area remote from this plant, for a very long period of time, and could for all practical purposes be considered as an irreversible commitment of resources.

I-J.A. 263.

No attempt is made to estimate the quantity of wastes produced, describe what precautions must be taken, or assess the costs and risks involved.

[17] When the final full-power, full-term operating license for the Vermont Yankee Nuclear Power Station was issued, the

The order granting a full-term license for the Vermont Yankee plant is hereby remanded to await the outcome of further proceedings in the rulemaking, discussed hereafter.

III. RULEMAKING (74-1586)

(A.)

The notice of proposed rulemaking, 37 Fed.Reg. 24191 (Nov. 15, 1972), suggested as a possible alternative to the rule of *Vermont Yankee, supra*, that a series of specified numerical values (set out as Table S-3 in the notice) be factored into the cost-benefit analysis for individual

---

Appeal Board "declined to re-examine" its earlier holdings that reprocessing and waste disposal issues need not be considered, since the rulemaking proceeding was then pending. I-J.A. 495-96. As a result, the Government argues the only issue raised is "whether the Commission under the National Environmental Policy Act (NEPA) could deal with fuel cycle issues by rulemaking, instead of in the context of numerous separate adjudications, such as the Vermont Yankee licensing proceeding." Respondent's brief at 5.

No one questions the AEC's power to do so in this proceeding. *Cf.* Union of Concerned Scientists v. AEC, 499 F.2d 1069 (D.C.Cir. 1974). Nor do we doubt that generic proceedings are a more efficient forum in which to develop these issues without needless repetition and potential for delay. *See* Ecology Action v. AEC, 492 F.2d 998, 1002 (2d Cir. 1974) (Friendly, J.) (dictum); Note, "The Use of Generic Rulemaking to Resolve Environmental Issues in Nuclear Power Plant Licensing," 61 VA.L.REV. 869, 878-79 (1975). However, the decision to hold generic proceedings rather than to leave these issues for individual licensings is left to agency discretion. *See infra* note 27.

What the agency may not do, consistent with NEPA, is to fail to give these issues adequate consideration in either forum. Thus, until an adequate generic proceeding is held (which may also consolidate a number of pending cases, *see, e.g.*, Specialized Common Carrier Services, 29 F.C.C. 870 (1971)), these issues will be ripe in individual licensing proceedings.

reactors.[18] These values were intended to represent the

---

[18]

TABLE S-3.—*Summary of environmental considerations for uranium fuel cycle*

[Normalized to model LWR annual fuel requirement]

Natural resource use	Total	Maximum effect per annual fuel requirement of model 1,000 MWe LWR
Land (acres):		
Temporarily committed	68	
Undisturbed area	45	
Disturbed area	13	Equivalent to 80 MWe coal-fired powerplant.
Permanently committed	4.6	
Overburden moved (millions of MT)	2.7	Equivalent to 90 MWe coal-fired powerplant.
Water (millions of gallons):		
Discharged to air	155	≈2 percent model 1,000 MWe LWR with cooling tower.
Discharged to water bodies	11,040	
Discharged to ground	129	
Total	11,319	<4 percent of model 1,000 MWe LWR with once-through cooling.
Fossil fuel:		
Electrical energy (thousands of MW-hour)	317	<3 percent of model 1,000 MWe LWR output.
Equivalent coal (thousands of MT)	115	Equivalent to the consumption of a 45 MWe coal-fired powerplant.
Natural gas (millions of scf)	93	<0.3 percent of model 1,000 MWe energy output.
Effluents—chemical (MT):		
Gases (including entrainment):[1]		
SO_x	4,400	Equivalent to emissions from 45 MWe coal-fired plant for a year.
NO_x[2]	1,177	
Hydrocarbons	13.8	
CO	28.7	
Particulates	1,154	
Other gases:		
F	.72	Principally from UF_6 production enrichment and reprocessing. Concentration within range of state standards—below level that has effects on human health.
Liquids:		
$SO_4^=$	10.2	From enrichment, fuel fabrication, and reprocessing steps. Components that constitute a potential for adverse environmental effect are present in dilute concentrations and receive additional dilution by receiving bodies of water to levels below permissible standards. The constituents that require dilution and the flow of dilution water are: NH_3—600 cfs; NO_3—20 cfs; Fluoride—70 cfs
NO_3^-	26.7	
Fluoride	12.9	
Ca^{++}	5.4	
Cl^-	8.6	
Na^+	14.9	
NH_3	11.5	
[illegible]	.4	
[illegible]	[illegible]	
Tailings solutions (thousands of MT)	240	From mills only—no significant effluents to environment.
Solids	91,000	Principally from mills—no significant effluents to environment.
Effluents—Radiological (curies):		
Gases (including entrainment):		
Rn-222	73	Principally from mills—maximum annual dose rate <4 percent of average natural background within 5 mi of mill. Results in 0.06 man-rem per annual fuel requirement.
Ra-226	.02	
Th-230	.02	
Uranium	.002	
Tritium (thousand)	16.7	Principally from fuel reprocessing plants—Whole body dose is 4 man-rem per annual fuel requirements for population within 50 mi radius. This is <0.007 percent of average natural background dose to this population. Release from Federal Waste Repository of 0.005 Ci/yr has been included in fission products and transuranics total.
Kr-85 (thousands)	330	
I-129	.0034	
I-131	.024	
Fission products and transuranics	1.01	
Liquids:		
Uranium and daughters	2.1	Principally from milling—included in tailings liquor and returned to ground—no effluents; therefore, no effect on environment.
Ra-226	.0034	From UF_6 production-concentration 9 percent of 10 CFR 20 for total processing of 27.5 model LWR annual fuel requirements.
Th-230	.0015	
Th-234	.01	From fuel fabrication plants—concentration 10 percent of 10 CFR 20 for total processing 26 annual fuel requirements for model LWR.
Rn-222[3]	.15	From reprocessing plants—maximum concentration 4 percent of 10 CFR 20 for total reprocessing of 26 annual fuel requirements for model LWR.
Tritium (thousands)	2.5	
Solids (buried):		
Other than high level	601	All except 1 Ci comes from mills—included in tailings returned to ground—no significant effluent to the environment. 1 Ci from conversion and fuel fabrication is buried.
Thermal (billions)	2,980	<7 percent of model 1,000 MWe LWR.
Transportation (man-rem): Exposure of workers and general public	.334	

[1] Estimated effluents based upon combustion of equivalent coal for power generation.
[2] 1.3 percent from natural gas use and process.
[3] Co-137 (0.275 Ci/AFR) and Sr-90 (0.004 Ci/AFR) are also emitted.

incremental contribution of a hypothetical 1000 MWe model light water reactor to the total environmental effect of the uranium fuel cycle. While expressed as numerical values in Table S-3, a fair summary of the conclusions incorporated into the rule is that the environmental effects of the fuel cycle are "insignificant." [19] The notice further stated that the "supporting data for this summary table" is contained in a staff document entitled the "Environmental Survey of the Nuclear Fuel Cycle" (Nov. 6, 1972) [hereafter "Environmental Survey"], which was simultaneously made public.[20]

An "informal rulemaking hearing" of the "legislative-type" was scheduled to receive comments in the form of "oral or written statements." [21] By subsequent notice, the Commission designated a three-member hearing board to preside, and reiterated, "The procedural format for the hearing will follow the legislative pattern, and no discovery or cross-examination will be utilized." 38 Fed. Reg. 49 (Jan. 3, 1973).[22]

---

[19] In explaining its decision not to require Table S-3 to be applied retroactively, the Commission stated:

> In view of the fact that the environmental effects of the uranium fuel cycle have been shown to be relatively insignificant, the Commission believes that it is unnecessary to apply the [rule] to . . . environmental reports submitted prior to its effective date. . . .

39 Fed.Reg. 14190 (April 22, 1974); II-J.A. 508.

[20] 37 Fed.Reg. 24192 n.1; *id.*, 24193.

It is conceded that the Environmental Survey was not "intended to be a detailed environmental statement as defined in the National Environmental Policy Act of 1969. . . ." I-J.A. 512; 39 Fed.Reg. 14188 (April 22, 1974), II-J.A. 507.

[21] 37 Fed. Reg. 24191 (Nov. 15, 1972).

[22] It should be noted that members of the presiding hearing board were empowered to ask questions, and occasionally did. In addition, "over 100 pages of handwritten calculations" and

The primary argument advanced by the public interest intervenors is that the decision to preclude "discovery or cross-examination" denied them a meaningful opportunity to participate in the proceedings as guaranteed by due process. They do not question the Commission's authority to proceed by informal rulemaking, as opposed to adjudication. They rely instead on the line of cases indicating that in particular circumstances procedures in excess of the bare minima prescribed by the Administrative Procedure Act, 5 U.S.C. § 553, may be required.[23]

---

prior drafts of the Environmental Survey were eventually placed in the public document room. 39 Fed.Reg. 14190-91 (April 22, 1974).

None of these documents, however, dealt with the crucial waste disposal issues covered by Dr. Pittman, *see infra* pp. 23-32.

[23] *See, e.g.*, Mobil Oil Corp. v. FPC, 157 U.S.App.D.C. 235, 483 F.2d 1238, 1260 (1973); International Harvester Co. v. Ruckelshaus, 155 U.S.App.D.C. 411, 478 F.2d 615, 629-31, 649 (1973); Appalachian Power Co. v. EPA, 477 F.2d 495, 503 (4th Cir. 1973); Walter Holm & Co. v. Hardin, 145 U.S.App. D.C. 347, 449 F.2d 1009, 1016 (1971); American Airlines, Inc. v. CAB, 123 U.S.App.D.C. 310, 359 F.2d 624, 632-33 (en banc), *cert. denied*, 385 U.S. 843 (1966).

See also, Williams, *"Hybrid Rulemaking" under the Administrative Procedure Act: A Legal and Empirical Analysis*, 42 U.CHI.L.REV. 401 (1975); Wright, *Court of Appeals Review of Federal Regulatory Agency Rulemaking*, 26 ADMIN. L.REV. 199 (1974); Wright, *The Courts and the Rulemaking Process: The Limits of Judicial Review*, 59 CORNELL L.REV. 375 (1974). Verkuil, *Judicial Review of Informal Rulemaking*, 60 VA.L.REV. 185, 234-49 (1974); Note, *The Judicial Role in Defining Procedural Requirements for Agency Rulemaking*, 87 HARV.L.REV. 782 (1974); Hamilton, *Procedures for the Adoption of Rules of General Applicability: The Need for Procedural Innovation in Administrative Rulemaking*, 60 CALIF.L.REV. 1276, 1313-30 (1972); Claggett, *Informal Action —Adjudication—Rulemaking: Some Recent Developments in Federal Administrative Law*, 1971 DUKE L.J. 51, 78.

The Government concedes that "basic considerations of fairness may under exceptional circumstances" require additional procedures in "legislative-type proceedings," but contends that the procedures here were more than adequate.[24] Thus, we are called upon to decide whether the procedures provided by the agency were sufficient to ventilate the issues.[25]

---

[24] Respondent's brief at 13-14.

[25] We disagree with Intervenor Baltimore Gas & Electric Co.'s threshold objection that the public interest intervenors failed to make a proffer of the specific issues and witnesses which they claimed could not adequately be explored without cross-examination as required by International Harvester Co. v. Ruckelshaus, *supra* note 23, 478 F.2d at 630-31; *see also* American Airlines v. CAB, *supra* note 23, 359 F.2d at 632-33. The public-interest intervenors submitted a thorough legal brief demanding cross-examination and discovery rights. CNI-UCS Statement with Respect to Legal Considerations of the Proposed Regulations on the Nuclear Fuel Cycle, 20-29; II-J.A. 225, 245, 254. The first point made by Mr. Roisman, attorney for the public interest intervenors, in the oral hearings was a request to be allowed to go behind the reassurances offered by Dr. Pittman:

> The Atomic Energy Commission continues to take subjects as important as nuclear waste disposal and treat them in a cavalier manner that we find them treated in this environmental survey. They continue to raise the issues of the environmental [sic] fuel cycle in the most obtuse manner, and subject it to this type of a legislative hearing, while refusing to face up to the fact that the public demands the right to cross-examine and to have discovery on these issues, that we are not satisfied with Mr. Pittman's well intentioned, but, we think, not at all well explained position with regard to the ability to handle nuclear wastes for hundreds of thousands of years. He has in his own words referred to it as a program of perpetual management . . . . I think the public deserves the right to ask the question, What does that mean?

II-J.A. 121-22. That was sufficient to focus the agency's attention on Dr. Pittman's testimony as in the category of "soft and sensitive subjects and witnesses." International Harvester, *supra*, 478 F.2d at 631. *See infra*, pp. 32-33.

To be sure, the public interest intervenors did not show that these issues could not be explored except through cross-examination; nor did they attempt such a showing. Their argument, as we understand it, is not that cross-examination was required *per se*, but that the procedures utilized by the Commission were in the aggregate inadequate sufficiently to ventilate the issues. They recognize, for example, that exploration of the underlying methodology of the Environmental Survey could have been facilitated by adequate discovery, as an alternative to cross-examination of the staff. *See* Petitioner's Brief, 13-15.

A few general observations are in order concerning the role of a court in this area. Absent extraordinary circumstances, it is not proper for a reviewing court to prescribe the procedural format which an agency must use to explore a given set of issues.[26] Unless there are statutory directives to the contrary, an agency has discretion to select procedures which it deems best to compile a record illuminating the issues.[27] Courts are no more expert at fashioning administrative procedures than they are in

---

[26] The Supreme Court has recently cautioned against requiring an agency to use particular procedures on remand:

> At least in the absence of substantial justification for doing otherwise, a reviewing court may not, after determining that additional evidence is requisite for adequate review, proceed by dictating to the agency the methods, procedures, and time dimension of the needed inquiry and ordering the results to be reported to the court without opportunity for further consideration on the basis of the new evidence by the agency.

FPC v. Transcontinental Gas Pipe Line Corp., 96 S.Ct. 579, 583 (1976) (per curiam) [footnote omitted].

[27] *See* NLRB v. Bell Aerospace Co., 416 U.S. 267, 292-95 (1974); SEC v. Chenery Corp., 332 U.S. 194, 203 (1947) (Chenery II); Siegel v. AEC, 400 F.2d 778, 783 (D.C.Cir. 1968).

the substantive areas of responsibility which are left to agency discretion.[28] What a reviewing court can do, however, is scrutinize the record as a whole to insure that genuine opportunities to participate in a meaningful way were provided, and that the agency has taken a good, hard look at the major questions before it.

We have sometimes suggested that elucidation of certain types of issues, by their very nature, might require particular procedures, including cross-examination.[29] In fact, we have been more concerned with making sure that the record developed by agency procedures discloses a thorough ventilation of the issues than with what devices the agency used to create the dialogue.[30]

---

[28] That may be reflected in the finding that in most cases where the right to cross-examination was won on appeal, it was not actually used on remand, the parties instead agreeing on more flexible procedures such as written memoranda explaining technical methodology or informal staff conferences which better suited their needs. *See* Williams, *supra* note 23, 42 U.CHI.L.REV. at 436-37; 448-54.

[29] *See, e.g.*, International Harvester v. Ruckelshaus, *supra* note 23, 478 F.2d at 631 ("soft and sensitive subjects and witnesses"); *but cf.* O'Donnell v. Shaffer, 160 U.S.App.D.C. 266, 491 F.2d 59, 62 (1974) (Bazelon, C.J.): "the presence of technical issues in and of itself [does not] create a need for cross-examination."

[30] *See, e.g.*, Walter Holm & Co. v. Hardin, *supra* note 23, 449 F.2d at 849: "What counts is the reality of an opportunity to submit an effective presentation, to assure that the Secretary and his assistant will take a hard look at the problems in light of those submissions."; International Harvester v. Ruckelshaus, *supra* note 23, 478 F.2d at 631: "There was a meaningful opportunity to be heard. . . . The record reveals that the hearing officers did not propound the pre-submitted questions like robots; they were charged with conducting a hearing for the purpose of focusing information needed for decision and they quite appropriately 'followed up' on questions."; O'Donnell v. Shaffer, *supra* note 23, 491 F.2d at 62: "Here the agency's proceedings provided an adequate opportunity for the airing of technical disputes. Appellants presented their evidence orally and in writing and questioned a supporter of the rule who testified at the hearing. The agency considered the evidence presented at the hearing in its 'Disposition of Petition.' On these facts, the procedures were adequate for the task at hand."; Ethyl Corp. v. EPA, No. 73-2205 (D.C.Cir., March 19, 1976) (en banc) (opinion of Wright, J.), slip op., 119-22, —— F.2d ——, ——, *cert. denied*, 44 U.S.L.W. 3719 (June 10, 1976), reviewing in detail the procedures used and the agency's lengthy opinion and concluding: "The complex scientific questions presented by this rulemaking proceeding were resolved in the crucible of debate through the clash of informed but opposing scientific and technological viewpoints." [Citation omitted.]

Of necessity, assessing agency procedures requires that the reviewing court immerse itself in the record. Abstract characterizations are an unsatisfactory guide for determining what procedures are necessary in particular proceedings.[31] Alternative procedural techniques are usually available, and the absence of one device, such as cross-examination, may be compensated for by the sensitive use

---

[31] *See* Wright, *supra* note 23, 26 ADMIN.L.REV. at 206-7; *id.*, 59 CORNELL L.REV. at 387-88.

Judge Tamm professes surprise that one who believes judges must avoid making "plausible-sounding, but simplistic, judgments of the relative weight to be afforded various pieces of technical data," Ethyl Corp. v. EPA, *supra* note 30 (Bazelon, C.J., concurring), slip op., 2, nonetheless believes review of agency procedures requires conscientious attention to the state of the record. Concur, n. 7.

There is, however, a difference crucial to the institutional competency of judges between the majority opinion here and the panel opinion, joined by Judge Tamm, which was overturned by the court *en banc* in *Ethyl*. The panel in *Ethyl* took it upon itself to decide that an expert agency had made "clear errors of judgment" in evaluating conflicting scientific studies. Slip op., 48. Here we merely systematically catalog the state of the record to verify that the agency has digested and addressed the major issues.

of substitutes.[32] If review is to be meaningful, it must focus on the actual operation of the whole range of procedures in a particular setting—including "contexts of fact, statutory framework, and nature of action."[33]

A prominent feature of the statutory context created by NEPA is the requirement that the agency acknowledge and consider "responsible scientific opinion concerning possible adverse environmental effects" which is contrary to the official agency position. (*see, e.g., infra* note 51). *Committee for Nuclear Responsibility, Inc.* v. *Seaborg*, 463 F.2d 783, 787 (D.C. Cir. 1971). NEPA requires that agencies see to it that "the officials making the ultimate decision [are] informed of the full range of responsible opinion on the environmental effects in order to make an informed choice." *Id.* The decision to proceed by rulemaking neither relieves the Commission of this obligation, nor permits it to depend solely on whatever contributions intervenors happen to make to develop a fair representation of scientific opinion for the record.[34]

---

[32] *See* International Harvester v. Ruckelshaus, *supra* note 23, 478 F.2d at 631.

[33] Kennecott Copper Corp. v. EPA, 149 U.S.App.D.C. 231, 235, 462 F.2d 846, 850 (1972).

[34] At least in the NEPA context, an agency has an affirmative obligation to explore the issues in depth, rather than wait passively until an intervenor takes the initiative. *See* Calvert Cliffs' Coordinating Comm. v. AEC, *supra* note 14, 449 F.2d at 1118-19. There the Commission proposed to limit consideration to environmental issues "which parties affirmatively raise." The court held that was inconsistent with NEPA's "basic mandate":

> The primary responsibility for fulfilling that mandate lies with the Commission. Its responsibility is not simply to sit back, like an umpire, and resolve adversary contentions at the hearing stage. Rather, it must take the initiative. . . .

See also Scenic Hudson Preservation Conference v. FPC, 354 F.2d 608, 620-21 (2d Cir. 1965), *cert. denied*, 384 U.S. 941 (1966) (agency duty to develop full record grounded on broad principles of administrative law); Note, *supra* note 17, 61 VA.L.REV. at 891: "when the record is deficient, the Commission may even have a duty to consider issues ignored by the parties."

In order to determine whether an agency has lived up to these responsibilities, a reviewing court must examine the record in detail to determine that a real give and take was fostered on the key issues. This does not give the court a license to judge for itself how much weight should be given particular pieces of scientific or technical data, a task for which it is singularly ill-suited. It does require, however, that the court examine the record so that it may satisfy itself that the decision was based "on a consideration of the relevant factors."[35] Where only one side of a controversial issue is developed in any detail, the agency may abuse its discretion by deciding the issues on an inadequate record.

A reviewing court must assure itself not only that a diversity of informed opinion was heard, but that it was genuinely considered. "[T]he dialogue that the APA's rulemaking section contemplates cannot be a sham."[36] Since a reviewing court is incapable of making a penetrating analysis of highly scientific or technical subject matter on its own, it must depend on the agency's ex-

---

In both *Calvert Cliffs* and *Scenic Hudson*, the court pointed out that poorly-financed public interest intervenors may lack the wherewithal to marshal technical evidence and bring it to the Commission's attention. *See also* American Public Power Ass'n v. FPC, 522 F.2d 142, 147 (D.C.Cir. 1975) (Bazelon, C.J., concurring); Citizens for Safe Power v. NRC, 524 F.2d 1291, 1304 (D.C.Cir. 1975) (Bazelon, C.J., concurring).

[35] Citizens to Preserve Overton Park, Inc. v. Volpe, 401 U.S. 402, 416 (1971). *Cf.* Ethyl Corp. v. EPA, *supra* note 30 (Bazelon, C.J., concurring), slip op., 2 n.7.

[36] Wright, *supra* note 23, 26 ADMIN.L.REV. at 206.

pertise, as reflected in the statement of basis and purpose, to organize the record, to distill the major issues which were ventilated and to articulate its reasoning with regard to each of them.[37]

An agency need not respond to frivolous or repetitive comment it receives. However, where apparently significant information has been brought to its attention, or substantial issues of policy or gaps in its reasoning raised, the statement of basis and purpose must indicate why the agency decided the criticisms were invalid.[38] Boilerplate generalities brushing aside detailed criticism on the basis of agency "judgment" or "expertise" avail nothing; what is required is a reasoned response, in which the agency points to particulars in the record which, when coupled with its reservoir of expertise, support its resolution of the controversy.[39] An agency may abuse its discretion by proceeding to a decision which the record before it will not sustain, in the sense that it raises fundamental questions for which the agency has adduced no reasoned answers.

(B.)

With these observations in mind, we turn to our examination of this record. The significance of Table S-3 is that it expresses in numerical terms the conclusion that the environmental effects of the fuel cycle, including waste

[37] *See* Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 393-95 (D.C.Cir. 1973), *cert. denied*, 417 U.S. 921 (1974); *cf.* Automotive Parts & Accessories Ass'n v. Boyd, 407 F.2d 330, 338 (D.C.Cir. 1968) (statement of basis and purpose must be explicit enough to allow court "to see what major issues of policy were ventilated by the informal proceedings and why the agency reacted to them as it did").

[38] Portland Cement Ass'n v. Ruckelshaus, *supra* note 37, 486 F.2d at 393-94.

[39] *See* Wright, *supra* note 23, 26 ADMIN.L.REV. at 209-210.

disposal, are insubstantial.[40] The primary basis for these judgments is the data assembled by the staff in the draft Environmental Survey made public with the proposed rule. The conclusions reached by the staff in the Environmental Survey were in turn adopted without modification by the Commission as Table S-3 and embodied in the final rule. Thus, support for a rule limiting consideration of environmental issues to the numbers in Table S-3 must be found in one of three places: the Environmental Survey, the back-up documentation to which it refers, and the oral and written testimony offered at the hearing. It is to these sources we must look for a thorough ventilation of the underlying issues.

The Environmental Survey made public prior to the hearing was intended to "provide[] a basis for an informed consideration of the . . . environmental impact associated with the uranium fuel cycle . . . [and to] contain[] extensive references to background documents available to members of the public." 38 Fed.Reg. 49 (Jan. 3, 1973). Regarding most phases of the fuel cycle, these promises were fulfilled and the Environmental Survey did an adequate, even admirable job, of describing the processes involved. It assembles data on the consumption of resources, and discusses the risks of accidents and other hazards in detail, supporting the staff's conclusions with numerous references to the scholarly literature and to technical reports on file with the Commission. However, with regard to the two phases of the fuel cycle which are the focal points for this appeal, reprocessing and waste disposal,[41] that kind of detailed explanation

[40] *See supra* note 19.

[41] In a general way, "reprocessing" is that phase of the fuel cycle in which reusuable portions of spent fuel are extracted for recycling and the remaining radioactive residues are concentrated. "Waste disposal," a misnomer for what is more appropriately termed "waste storage and manage-

and support for the staff's conclusions was noticeably absent from the Environmental Survey as originally published.

The only discussion of high-level waste disposal techniques was supplied by a 20-page statement by Dr. Frank K. Pittman, Director of the AEC's Division of Waste Management and Transportation. This statement, delivered during the oral hearings, was then incorporated, often verbatim, into the revised version of the Environmental Survey published after the comment period.[42] Dr. Pittman began his statement by acknowledging that he was "broadly involved" with the subject of high-level waste management since he heads the division of the AEC charged with "responsibility for the development, construction and operation of facilities for ultimate management of commercial high-level waste." [43]

Dr. Pittman proceeded to describe for the first time in public the "design concepts" for a federal surface repository for retriveable storage of high-level waste.[44] This is essentially a warehouse in which sealed canisters containing cylinders of solidified nuclear wastes can be stored in water-filled basins recessed into the ground on a temporary basis (up to 100 years), until such time as a permanent waste disposal scheme is devised, when they can be removed.[45] While the "intended life" of the facility is only 100 years, some high-level wastes must be isolated for up to 250,000 years. *See supra* p. 7. Therefore, the Environmental Survey states, without further explanation, that in the future a "permanent" Federal repository for "geologic storage of high-level wastes" will be established and that the "Federal government will have the obligation to maintain control over the site *in perpetuity*." II-J.A. 724 [emphasis added].

Until recently the AEC planned to dispose of wastes by burying them deep inside abandoned salt mines. These plans were postponed indefinitely after a series of tech-

---

ment," refers to containment of wastes during the long periods necessary for them to decay naturally into non-toxic substances. *See supra* note 3.

[42] *See* "Environmental Survey of the Uranium Fuel Cycle" (April, 1974) (hereafter "Revised Environmental Survey") G-23 n.18, II-J.A. 740.

For example, the discussion of the possibility of accidental release of wastes as a result of loss of coolant at *id.*, G-19-21, II-J.A. 736-737, is taken verbatim from Dr. Pittman's statement.

[43] II-J.A. 59. In Portland Cement Ass'n v. Ruckelshaus, *supra* note 37, 486 F.2d at 400 n.95, the court pointed out that where a "principal source of reliance by the agency" was "peculiarly subject to considerations of self-interest, more might be required than mere comments." Evaluation of a program by the in-house staff member charged with the responsibility for administering it falls within the intendment of that statement.

[44] The staff subsequently described the significance of Dr. Pittman's testimony as follows:

> When the [Environmental Survey] was published in November 1972, the data on the proposed Federal Repository for high level waste storage were limited to preliminary criteria and generalized statements. . . . The information in Dr. Pittman's statement is the first public release of the preliminary concepts for the Federal Repository and provides a summary of the current status and potential environmental effects of the high level waste interim storage facility and further AEC plans for longer term storage. The information from his testimony will be incorporated in the revised edition of the [Environmental Survey]. . . . The additional data presented by Dr. Pittman show that the interim high-level waste repository will be designed to have little environmental impact.

"Additional Information on Environmental Effects of the Uranium Fuel Cycle," II-J.A. 355-56.

[45] *See* Revised Environmental Survey, G-7, II-J.A. 724.

nical difficulties, including the discovery the salt mines might be susceptible to underground flooding. The Revised Environmental Survey devotes two sentences to recounting how prior waste disposal plans fared:

> It was planned to construct a Federal repository in a salt mine for long-term geological storage of solid high-level wastes by the mid 1970's. However, subsequent events have deferred the site selection and construction of such a facility.

II-J.A. 724. The "subsequent events" which led to the shelving of the salt mine plan are not discussed.[46]

---

[46] The difficulties encountered regarding the primary site considered, salt beds near Lyons, Kansas, have recently been summarized as follows:

> Although that site had been under consideration for many years by the [AEC], it was not until 1971 that the commission and its contractors discovered two major problems with it. One was a series of abandoned gas and oil drill holes in the area. Another was an adjacent salt mine's extensive use of water to dissolve out the salt—including a hydraulic fracturing technique which had resulted in the disappearance underground of some 175,000 gallons of water. Both discoveries cast doubt on the long-term safety and integrity of the proposed Lyons site, since it appeared possible that water might penetrate the area and allow radioactive wastes to escape.

Boffey, "Radioactive Waste Site Search Gets Into Deep Water," 190 SCIENCE 361 (Oct. 24, 1975).

After the planned site near Lyons, Kansas was abandoned, attention focused on salt beds in southeastern New Mexico. Unexpected problems have recently been encountered at this site, too. A test hole hit a large underground pocket of brine and explosive gases. Not only would the presence of these gases threaten the safety of workers at any facility, but a "second disturbing aspect is that the presence of the brine solution may indicate that fluids have been migrating underground, thereby threatening the integrity of the site." *Id.* As the result, the search for a suitable site has been moved once again, this time to an area several miles away.

Dr. Pittman's description of the new plan—now also postponed indefinitely[47]—to build a surface storage facility can only fairly be described as vague, but glowing. He begins:

> . . . I hope I will be able to allay what I feel are unwarranted fears . . . and show that the bugaboo of waste management cannot logically be used as a rationale for delays in the progress of an essential technology for meeting our growing power demands.
>
> • • • •
>
> [T]here are available today proven methods for managing the high-level waste from the nuclear industry in a way which will assure first that man will not be adversely affected by the radioactivity either by external or internal contact with the waste itself or by exposure to the penetrating radiation which it generates, and second that the environment [sic] effects will be very small.

II-J.A. 59-60. In less than two pages, he set out a very general description of what the facility is supposed to do, II-J.A. 63-66, accompanied by several schematic draw-

---

[47] By letter dated April 9, 1975, the Administrator of ERDA informed the Congressional Joint Committee on Atomic Energy that preliminary funding for a Retrievable Surface Storage Facility was being deleted from the fiscal 1976 budget request pending a "comprehensive reevaluation of the federal program in this critical and controversial area." *See* "ERDA Shelves a Nuclear Waste Storage Plan," 188 SCIENCE 345 (April 25, 1975).

As part of that review, we understand revised impact statements are being prepared concerning reprocessing and waste disposal. As those matters are not before us, we intimate no opinion regarding the extent to which they may cure the deficiencies in the present proceeding.

Recent Congressional testimony by ERDA officials indicates a return to the plan to bury wastes, although no site has been finally chosen. "Salt, Rock Formations Favored for A-Wastes," *Washington Post*, May 11, 1976, A-2, cols. 1-3.

ings. These show the facility will have a cooling system, a transfer area and storage basins, but do not attempt to describe how they will be built and operated, what materials will be used, where such a facility might be located, or what it might cost to build and operate.

Dr. Pittman then explains that "the major factor in the design of the repository for high-level waste is the technique used to remove the heat from the waste." II-J.A. 63. Decaying radioactive waste spontaneously gives off substantial heat and "[s]hould adequate provisions not be made to remove this heat . . ., the waste and the canister would melt." *Id.* A "meltdown" would result in what Dr. Pittman calls a "situation of considerable concern," which would involve the "loss of some fraction of the isolation of the radioactive material from the environment." II-J.A. 65. No attempt is made to describe how serious a radioactivity hazard would be presented.

In a paragraph which is carried over verbatim in the Revised Environmental Survey, II-J.A. 726, Pittman states:

> The Commission has carried out extensive evaluations of safety, reliability, operability, maintainability and economics of various methods for removing heat, and has essentially narrowed the area for further study to techniques using either water or air as the heat transfer medium.

II-J.A. 64. No citations are given for these studies; in fact, there are no references to back-up materials supporting any of Pittman's statement, or those portions of the Revised Environmental Survey drawn from it.[48]

---

[48] Following Dr. Pittman's presentation one of the presiding board members remarked:

> . . . one of the, I think, outstanding practices of the Staff has been in the past, at least as far as I can tell,

Again without benefit of details, Dr. Pittman offers conclusory reassurances that the proposed facility will be designed so that the possibility of a "meltdown" can be dismissed as "incredible":

> The probability of this situation occurring is prevented by a combination of engineered features including, (i) redundancy of power supply and other essential cooling systems; (ii) structural strength to withstand credible forces of nature—earthquake, tornado, etc.; (iii) combination of structural strength, plant security, etc., to withstand credible overt forces of man; (iv) modular basin cell construction which limits the number of canisters subject to a single catastrophic event.

> to meticulously document the assumptions that are made in the discussions. I find that that has not been done here. . . . I guess I must assume that one of the reasons that those assumptions have not been documented and clarified or justified in the purest sense of the word, is because of the time schedule required to get this thing on so we could get to hearings. Can it be assumed that if there is going to be a significant revision to this document that in those areas where assumptions are made, particularly where there is a statement to the effect that something is trivial, or insignificant, that somewhere there will appear in that same document some kind of justification based on data or a reference which one can go back to and find the source.

II-J.A. 116-17.

A staff member assured the questioner "[w]e will make every effort to go back and see if we can improve that," II-J.A. 118, and subsequently the staff submitted a 56 page document of "Additional Information on Environmental Effects of the Uranium Fuel Cycle," II-J.A. 352. However, less than two pages are devoted to the waste disposal issues addressed by Dr. Pittman, and these merely correct four minor numerical and typographical errors or omissions in his testimony. *See* II-J.A. 402-03. Nor does the Revised Environmental Survey fill in the gaps in Dr. Pittman's testimony.

> Thus, before a meltdown could occur, it would be necessary to have a series of failures of systems which will be engineered, constructed, and operated for maximum reliability under rigorous quality assurance programs before a situation could occur where sufficient water could not be added to and maintained in the cell to keep it from leaking or boiling dry. The timing for such a series of failures to result in uncorrectable situations is important. The individual failure of power systems for circulating the coolant would not result in pool water boiling for at least 16 hours. Various corrective actions may be taken any time within a week which would prevent cell water from boiling away. After the complete loss of water, an additional day would be required before the waste would begin to melt. The number of sequential failures required of highly reliable systems, combined with the long time periods available for repair and recovery from each, result in the judgment that this is an incredible incident.

II-J.A. 65-66. His unadorned conclusion is in turn incorporated verbatim into the Revised Environmental Survey.[49]

Other than the broad reference to "structural strength, plant security, etc., to withstand credible overt forces of man", there is no discussion of how the facility would be protected from terrorism.[50] While Dr. Pittman says

---

[49] *See* "Environmental Survey of the Uranium Fuel Cycle" (April, 1974) G-19-20, II-J.A. 736-737.

[50] When Dr. Henry Kendall, an expert witness for Consolidated National Intervenors, tried to raise the risks of terrorism, he met the following reception from the chairman of the hearing board:

> I have just one question . . . with regard to nuclear blackmail and the potential terrorist activities. What I am a little puzzled about is its relevance . . . . I say this with all due respect, Dr. Kendall; I guess those words are

"[v]arious corrective actions" might be taken to prevent a meltdown, none are specified.

Dr. Pittman concludes with the judgments that:

> . . . (1) the program being followed by the industry under AEC regulation and by the AEC offers assurance that the commercial high-level waste will be managed safely from its initial production; (2) the surface storage method, to be used by the AEC, is good for as long as adequate human surveillance and maintenance effort is continued; (3) the probability that work currently under way will demonstrate the use of bedded salt as a safe, acceptable, ultimate disposal method within the next ten to fifteen years is very high; (4) should bedded salt not prove to be acceptable, other acceptable geologic

---

exciting reading in the newspapers, but I would like to have [you] indicate the relevance between the responsibilities of the Atomic Energy Commission under the National Environmental Protection Act [sic] in these respects as against, at least, what I read to be the subject matter of your comments in this particular wise, and that is the military and potential security aspects of the transportation of nuclear materials. Do I make myself clear?

An attorney for the intervenors then explained that NEPA requires consideration of more than the "simplistic questions" of "how many fish will get hurt. . . ." The chairman responded:

> You see then, forgive me for using the word, a fusion somehow between what is known as, I understand, the impact on the environment as against the political and military security?

[Attorney]:

> Of course, what is precisely involved in political and military security is that someone threatens to do a heck of a lot of damage to the environment in exchange for something they want.

II-J.A. 213-16.

disposal concepts offer reasonable probability of reaching a point of acceptability within two or three decades; and (5) the waste in initial storage will be easily retrievable for either near- or far-term disposal methods when they are developed.

II-J.A. 82. There is no discussion of how "adequate human surveillance and maintenance" can be assured for the periods involved, nor what the long-term costs of such a commitment are, nor of the dangers if surveillance is not maintained.[51] Nor is any explanation offered for Dr. Pittman's optimism regarding bedded salt as a disposal method, since the problems which have surfaced and delayed that program are not mentioned.[52] Nor does the statement anywhere describe what "other

[51] A subsequent report to the Administrator of ERDA by a four-man task force, including Dr. Pittman, reflects a much less rosy assessment of the problems of reprocessing and waste disposal. NUCLEAR FUEL CYCLE: A REPORT OF THE FUEL CYCLE TASK FORCE, ERDA-33 (March, 1975).

The unanimous task force concluded, *inter alia*, "there are still many technical problems and uncertainties in the overall area of processing of spent fuel and properly managing its radioactive waste", *id.*, 40; "[t]he costs of storage and ultimate disposal . . . are very much higher than had previously been assumed . . . .", *id.*, 46; "[the public] fear[s] that the radioactive waste generated . . . will either be neglected, and thus place an unacceptable hazard potential on mankind, or be managed in a way that will place an unacceptable burden on future generations to assure continued public safety. [T]hese . . . fears . . . are supported by a fair segment of the scientific community—many of whom otherwise support the use of nuclear reactors for generation of electric power", *id.*, 49-50.

[52] *See supra* note 46. Contrary to Dr. Pittman's unexplained optimism, an article in SCIENCE recently termed finding a site for long-term disposal of radioactive wastes "one of the key unresolved problems of the nuclear era." Boffey, *supra* note 46, 190 SCIENCE 361 (Oct. 24, 1975).

acceptable geogologic disposal concepts" are under consideration.

When Dr. Pittman finished, no questions were put to him by the hearing board.[53] No cross-examination was permitted.

Based on Dr. Pittman's statement, the Revised Environmental Survey concludes that the resources consumed in waste storage will be minimal, that "under normal conditions" no radioactivity will be released, and that the possibility of a serious accident is "incredible."[54] In short, based on the information in Dr. Pittman's statement, the Commission concluded that the future environmental effects from the disposal of high-level nuclear wastes are negligible. This conclusion is in turn embodied in Table S-3, and further consideration of the issue terminated.

We do not dispute these conclusions. We may not uphold them, however, lacking a thorough explanation and a meaningful opportunity to challenge the judgments underlying them. Our duty is to insure that the reasoning on which such judgments depend, and the data supporting them, are spread out in detail on the public record. Society must depend largely on oversight by the technically-trained members of the agency and the scientific community at large to monitor technical decisions. The problem with the conclusory quality of Dr. Pitt-

[53] One short comment was made concerning commercial disposal of low-level waste, II-J.A. 115, as was the observation, quoted *supra* note 48, regarding failure to provide back-up documentation.

The board's quiescence regarding Dr. Pittman is in marked contrast to its often hostile questioning of expert witnesses for the intervenors. *See, e.g., supra* note 50.

[54] Revised Environmental Survey, *supra* note 42, G-2-G-3, II-J.A. 719-720.

man's statement—and the complete absence of any probing of its underlying basis—is that it frustrates oversight by anyone: Commission, intervenors, court, legislature or public. Given the opportunity, Dr. Pittman might have provided convincing answers to many of the questions which his statement leaves untouched. Since that did not occur, however, his judgments must either be accepted at face value, or rejected out of hand.

Although the vagueness of the presentation regarding waste disposal made detailed criticism of its specifics impossible, *see* II-J.A. 257, the public interest intervenors did offer a number of more general comments concerning the Commission's approach. They criticized the Commission for a general "failure to distinguish between design objectives on the one hand and performance on the other," II-J.A. 124, noting that no consideration had been given actual experience with storage of wastes generated by weapons production. II-J.A. 272-74. They also questioned confident assertions by the AEC that long-term waste management is feasible, laying particular stress on the immense time periods involved which mock human institutions:

> Except for the storage of liquid wastes in tanks, for which experience from weapons production applies, all proposals for long term storage or disposal of high level waste from the nuclear power industry lie at the research and development stage.
>
> * * * *
>
> The impression is inescapable, in view of the present imprecise state of affairs, that no convincing statements exist regarding the long term environmental impact attending the storage and/or disposal of wastes from fuel reprocessing.
>
> * * * *
>
> The times during which radioactive wastes must remain secure from the biosphere have no parallel

> in human affairs. Eight hundred years are required for fission products alone and millions of years if the fission products continue to be contaminated with transuranic elements at present levels. Fission technology requires that man issue guarantees on events far into the future, and it is not clear in most cases how this can be done. Institutional arrangements do not exist and never have existed to guarantee the monitoring of or attendance upon storage facilities over a millennium. In the range of a million years, serious geological uncertainties arise and even the survival of man may be doubtful. "In perpetuity" has little real meaning in human affairs.

II-J.A. 261-2. They reiterated repeatedly that the problems involved are not merely technical, but involve basic philosophical issues concerning man's ability to make commitments which will require stable social structures for unprecedented periods.[55]

The intervenors pointed out that storing wastes aboveground places a premium on stable human institutions for monitoring and surveillance, II-J.A. 275-76; that until plans for long-term disposal in the salt beds at Lyons, Kansas fell through, *see supra* note 46, the agency had itself rejected the idea of surface storage because of the surveillance problems. II-J.A. 210-11, 287-89.

After reviewing the record, the presiding hearing board isolated several areas of controversy which it felt ought to be addressed by the Commission in issuing the proposed rule. Included were the adequacy of the discus-

---

[55] II-J.A. 275-76. An illuminating perspective is provided in D. Farney, *Ominous Problem: What to Do with Radioactive Waste*, 5 SMITHSONIAN MAG. 20, —— (1974):

> The entire recorded history of mankind is but a fraction of the 250,000-year storage time of plutonium. Neanderthal man appeared only about 75,000 years ago.

sion of waste disposal systems,[56] and the need for fuller background documentation. II-J.A. 498.

The Commission disposed of these issues summarily in its statement of basis and purpose accompanying the promulgation of the rule without attempting to articulate responses to any of the points which had been raised regarding waste disposal:

> Considerable information was presented at the hearing on high level waste storage utilizing a retrievable surface storage facility. A description was given of such facility, the normal radiological effluents, and a maximum credible accident.
>
> • • • •
>
> While such a waste storage facility has not been constructed, preliminary conceptual designs have been developed using existing technology based on well established data and techniques.

[56] The presiding board wrote:

> At the time the Environmental Survey was issued for public comment in the Rulemaking Proceeding, together with the proposed amendments to the Rules, the Survey did not contain data with regard to proposed waste disposal systems. During the course of the oral presentation, the Regulatory Staff offered for the record an extensive presentation by Dr. Frank Pittman regarding various methods for waste disposal which were in the planning stage, and, based upon such planning, assigned various values regarding assumed environmental impact of such waste storage facilities. It was argued that, in all other respects, the Survey dealt with the environmental impact of actual and existing facilities; but that, with respect to waste disposal, the Survey was unreliable in that it dealt with non-existent facilities; . . . .

II-J.A. 490.

While this is not an entirely accurate synopsis of the intervenor's position as set out above, it focused the Commission's attention on this aspect of the proceedings.

> The Commission believes that the Survey and hearing record provide an adequate data base for the regulation adopted.

39 Fed.Reg. 14189 (April 22, 1974); II-J.A. 507.1 [unnumbered page following 507].[57] Thus, to the limited extent that any give-and-take was fostered on the nuclear waste issues, the Commission, in its final decision, failed to address major contentions that were raised.

(C.)

In substantial part, the materials uncritically relied on by the Commission in promulgating this rule consist of extremely vague assurances by agency personnel that problems as yet unsolved will be solved. That is an insufficient record to sustain a rule limiting consideration of the environmental effects of nuclear waste disposal to the numerical values in Table S-3. To the extent that uncertainties necessarily underlie predictions of this importance on the frontiers of science and technology, there is a concomitant necessity to confront and explore fully the depth and consequences of

[57] We note that the Commission also promised to undertake "a more definitive assessment" of the environmental effects of waste storage as more information becomes available through subsequent environmental impact statements. 39 Fed. Reg. 14190 (April 22, 1974); II-J.A. 508.

While that is praiseworthy as an acknowledgment of the Commission's responsibility to reassess its actions in the light of later information, it cannot be used as a bootstrap to excuse the present rule cutting off further consideration in licensing proceedings.

We have already held in *Vermont Yankee, supra* p. 8, that the Commission may not refuse to consider the environmental effects of waste disposal when it licenses an individual reactor simply by promising to consider them later when it licenses facilities for waste disposal. We see no reason why that principle applies with any less force to accomplishing the same result through rulemaking.

such uncertainties. Not only were the generalities relied on in this case not subject to rigorous probing—in any form—but when apparently substantial criticisms were brought to the Commission's attention, it simply ignored them, or brushed them aside without answer. Without a thorough exploration of the problems involved in waste disposal, including past mistakes, and a forthright assessment of the uncertainties and differences in expert opinion, this type of agency action cannot pass muster as reasoned decisionmaking.[58].

---

[58] We reject the contention that Table S-3 is itself a "major Federal action" requiring an environmental impact statement. The Commission characterized this rulemaking as merely addressing "a procedural question involving the implementation of NEPA . . . ." 39 Fed.Reg. 14188. *Cf.* Gage v. AEC, 479 F.2d 1214, 1222 n.26 (D.C.Cir. 1973). Petitioners, however, claim Table S-3 has "substantive" effect, since it establishes values for environmental effects on which subsequent licensing decisions may turn. Reply brief at 12. While we agree that Table S-3 may have important decisional consequences by implying that fuel cycle problems are manageable, in the circumstances presented here, we do not believe these implications ripen into a proposal for agency action until they are incorporated into individual licensing decisions. *Compare* Aberdeen & Rockfish R.C. v. SCRAP, 422 U.S. 289, 320 (1975) *with* SIPI, *supra* note 11, *and* Sierra Club v. Morton, 514 F.2d 856 (D.C.Cir. 1975), *rev'd sub nom.* Kleppe v. Sierra Club, 44 U.S.L.W. 5104 (U.S., June 28, 1976). At that point an impact statement will be prepared with regard to the licensing decision. We do not read the statute as requiring more.

Petitioners also argue that Table S-3 violates NEPA because it is incomprehensible to "non-technical minds." Environmental Defense Fund v. Corp of Engineers, 348 F.Supp. 916, 933 (W.D. Miss.), *aff'd.*, 492 F.2d 1123 (5th Cir. 1972). We do not reach that issue. The defects, if any, may be cured by fuller explanation in a revised statement of basis and purpose, or in subsequent NEPA statements incorporating Table S-3.

[Continued]

Many procedural devices for creating a genuine dialogue on these issues were available to the agency—including informal conferences between intervenors and staff, document discovery, interrogatories, technical advisory committees comprised of outside experts with differing perspectives, limited cross-examination, funding independent research by intervenors, detailed annotation of technical reports, surveys of existing literature, memoranda explaining methodology. We do not presume to intrude on the agency's province by dictating to it which, if any, of these devices it must adopt to flesh out the record. It may be that no combination of the procedures mentioned above will prove adequate, and the agency will be required to develop new procedures to accomplish the innovative task of implementing NEPA through rulemaking. On the other hand, the procedures the agency adopted in this case, if administered in a more sensitive, deliberate manner, might suffice.[59] Whatever techniques

---

[58] [Continued]

Finally, we reject the related argument that plenary consideration of alternatives was necessary in this proceeding. We agree with the Commission that this may be deferred until action is proposed to license particular disposal facilities. For purposes of this proceeding, provided a sufficiently conservative and credible assessment of a particular waste disposal method is used, it is not material that another method might turn out to be even more desirable. *See supra* note 13. Of course, we do not exclude the possibility that limited consideration of certain alternatives (*e.g.*, the consequences of not proceeding at all) may be necessary to meaningful judgments in a proceeding such as the present.

[59] Agencies are always free to adopt "hybrid procedures" beyond the minima prescribed by 5 U.S.C. § 553, and commonly do. United States v. Florida East Coast Ry., 410 U.S. 224, 236 n.10 (1973). In this case, the Commission elected to provide certain hybrid procedures in addition to those required by § 553—oral hearings and questioning by a presiding board. By listing other techniques, *supra* p. 39, which might aid the Commission in compiling an adequate record, we do not intimate that it must adopt any of them. What is of

the Commission adopts, before it promulgates a rule limiting further consideration of waste disposal and reprocessing issues, it must in one way or another generate a record in which the factual issues are fully developed.

Our colleague, concurring specially, expresses the view that there is "little to be gained other than delay" by remanding for additional proceedings, since it is "almost inevitable" that the Commission will reach the same result "after fully considering the problems and alternative methods of waste disposal." [60] Even if true, that would only supply an additional reason to require the Commission to acknowledge the risks and problems, as well as lay bare its own reasoning. Agencies are less likely

---

concern to us is that the record after remand disclose a thorough ventilation of the issues.

On paper, the procedures used to supplement § 553 here were virtually identical to those approved by the court in International Harvester v. Ruckelshaus, *supra* note 23, 478 F.2d at 631, in which oral statements were allowed and the hearing board was authorized to ask questions submitted by the parties. However, in practice the procedures were administered quite differently in *International Harvester:* "[T]he hearing officers did not propound the pre-submitted questions like robots; they were charged with conducting a hearing for the purpose of focusing information needed for decision and they quite appropriately 'followed up' on questions." *Id.* In this case the board members asked no questions whatsoever of Dr. Pittman. *See supra* note 53.

[60] Concur at 5. According to Judge Tamm, on remand "the Commission may or may not adopt one of the majority's [procedural] suggestions, but will in any case seek to comply by mechanically generating more 'negative' information respecting current problems with disposal of high level radioactive wastes and then will 'overcome' this information with citations to favorable studies and articles." *Id.*, 4.

Stripped of rhetoric, this means that the Commission may reach the same result on an adequate record—which, of course, is why we remand rather than reverse.

to persist in the face of information publicly exposing the fallacies, if any, in their position. In any event, NEPA does not guarantee a particular outcome on the merits; rather, the statute mandates only a "careful and informed decisionmaking process" to enlighten the decisionmaker and the public.[61] In the rulemaking context, that requires the Commission to identify and address information contrary to its own position, to articulate its reasoning and to specify the evidene on which it relies.[62] The Commission may well reach the same conclusion on remand. But if it does so on such a record, the Congress, the courts, and the public will all know where we stand.

• • • •

---

[61] *See* Calvert Cliffs' Coordinating Comm. v. AEC, *supra* note 14, 449 F.2d at 1115. *See also,* Comm. for Nuclear Responsibility, Inc. v. Seaborg, *supra,* 463 F.2d at 787; NRDC v. Morton, *supra* note 15, 458 F.2d at 833.

[62] Evidently Judge Tamm would permit Dr. Pittman to supplement his testimony without giving those who disagree an opportunity to criticize or comment on the new material (*e.g.*, "without reopening the oral proceeding," Concur at 3). We would not agree.

Unlike explanation of the *Commission's* rationale, Dr. Pittman's testimony is part of the evidentiary support underlying the proposed rule. *Cf.* Concur at 7. Both rudimentary procedural fairness and § 553 require that the evidentiary "basis" for a proposed rule be subject to public scrutiny and comment. *See* Portland Cement Ass'n v. Ruckelshaus, *supra* note 37, 486 F.2d at 393 n.67; Mobil Oil Corp. v. FPC, *supra* note 23, 483 F.2d at 1251 n.39. This variant of the traditional adversary process permits other experts, and the public, to bring to bear the purifying effect of their comments.

At least where the existing record is inadequate to sustain a rule, an agency cannot buttress its case with additional data not subject to public comment. "If a particular rule rests on an extensive analysis of data or a complex prediction . . . the agency should not rely on any research methods or data which were not presented to the interested parties for comment or criticism." Wright, *supra* note 23, 59 CORNELL L.REV. at 383, n.34 (1974).

It has become a commonplace among proponents of nuclear power to lament public ignorance.[63] The public—the "guinea pigs" who will bear the consequences of either resolution of the nuclear controversy—is apprehensive. But public concern will not be quieted by proceedings like the present.

> I know no safe depository of the ultimate powers of the society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion.[64]

* * * *

---

[63] *See, e.g.*, Remarks by USNRC Commissioner Edward A. Mason at MIT (March 4, 1976) *quoted* SCIENCE & GOV. RPT., 4 (April 1, 1976):

> So the biggest problem impeding the contribution of nuclear power in meeting the nation's energy needs seems to me to be the lack of informed public understanding. . . .
>
> * * * *

Edward Teller, "Nuclear Salvation," NEWSWEEK (May 17, 1976) at 15:

> Indeed, there is no better subject with which to scare people than nuclear energy. What is new, what is not completely understood, is always frightening. But nuclear energy is a special case. It comes from a remote part of research that, in the minds of many people, borders on science fiction. It was developed in wartime and shrouded in secrecy. It came to the attention of mankind when, in two strokes, more than 100,000 people were killed in the final days of a terrible war. . . . Can we, in our democratic society, overcome unreasonable fears?

[64] Thomas Jefferson, Letter to William Charles Jarvis (Sept. 28, 1820).

The Commission's action in cutting off consideration of waste disposal and reprocessing issues in licensing proceedings based on the cursory development of the facts which occurred in this proceeding was capricious and arbitrary.. The portions of the rule pertaining to these matters are set aside and remanded.[65]

---

[65] We are aware of suggestions that where agency action is based on an inadequate record, the appropriate remedy may be to remand for supplementation rather than a declaration that the rule or order is invalid. *See* Leventhal, *Environmental Decisionmaking and the Role of the Courts*, 122 U.PA.L.REV. 509, 539 (1974). *But cf.* Camp v. Pitts, 411 U.S. 138, 143 (1973): If the decision of the agency "is not sustainable on the administrative record made, then the . . . decision *must be vacated* and the matter remanded . . . for further consideration." *quoted* F.P.C. v. Transcontinental Gas Pipe Line Corp., *supra* note 26, 96 S.Ct. at 582 [emphasis added].

Separate Statement of Chief Judge BAZELON:

I add a word of my own on some of the broader implications of Judge Tamm's concurrence.

I agree that courts should be reluctant to impose particular procedures on an agency. For example, requiring cross-examination in a rulemaking proceeding is radical therapy, which may cause the patient to suffer a slow, painful death. "There is a not insignificant potential for havoc . . . [which is] likely to be disproportionate to the values achieved. . . ." *International Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 631 (D.C.Cir. 1973). But I reject the implication that any techniques beyond rudimentary notice and comment are needless "over-formalization" of informal rulemaking. Concur at 5. Unhappily, no such bright line can be drawn between rulemaking and adjudicatory proceedings.[1]

---

[1] The concurrence relies on Wright, *The Courts and the Rulemaking Process: The Limits of Judicial Review*, 59 CORNELL L.REV. 375 (1974), which explicitly assumes an idealized model differentiating sharply between "policy-type rules or standards, on the one hand, and proceedings designed to adjudicate particular cases on the other." *Id.*, 386. This model posits that accurately determining facts is relatively unimportant in rulemaking because the "ultimate shape of the rule seldom 'follows from the facts.'" *Id.*, 379 n.15. Based on this conceptual distinction, drawn from Bi-Metallic Investment Co. v. State Bd. of Equalization, 239 U.S. 441 (1915), it is argued "An adjudication is fair to the individual only if the facts are accurately found. . . . [I]n the rulemaking context, fairness is not identified with accuracy, and procedures designed to maximize accuracy at the cost of all other values are simply inappropriate." *Id.*, 379.

With all due respect, this assumes away the hybrid rulemaking problem which arises primarily when rulemaking procedures are used in contexts where accurate fact-finding *is* of high relative importance. *See infra* p.2 and n.3.

The purpose of rulemaking was to allow public input on policy, whereas adjudication was designed to resolve disputed facts. *See supra* note 1. However, in response to the "paralysis" of the administrative process in the last decade, rulemaking has been expanded into fact-intensive areas previously thought to require adjudicatory procedures.[2] Administrative proceedings are now common which do not fit neatly into either the rulemaking or adjudicatory category. These new proceedings are "hybrids" in the sense that they involve issues of general applicability which can be treated efficiently only in generic proceedings, but nonetheless involve factual components of such relative importance that a greater assurance of accuracy is required than that which accompanies notice and comment procedures.[3]

---

[2] *See, e.g.*, United States v. Allegheny-Ludlum Steel Corp., 406 U.S. 742 (1972); United States v. Florida East Coast Ry., 410 U.S. 224 (1973) (ratemaking).

[3] The development of scientific or technical standards is a prime example. These decisions may involve both assessing scientific evidence, and also a "legislative" or policy component as to what level of risk is "safe," and how uncertainties are to be valued. *See* Handler, *A Rebuttal: The Need for a Sufficient Scientific Base for Governmental Regulation*, 43 GEO.WASH.L.REV. 808, 809 (1975).

The relative centrality of the fact-finding and policy-making components may vary depending on the precise regulatory scheme and the state of knowledge. *Compare* Ethyl Corp. v. EPA, No. 73-2205 (D.C.Cir., March 19, 1976) (en banc) (legislative policy decision) *with* Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 390-402 (D.C.Cir. 1973), *cert. denied*, 417 U.S. 921 (1974).

The present proceeding was devoted almost entirely to technical fact-finding. The Commission characterized its purpose as data-gathering, rather than an analysis of alternatives or costs and benefits, 39 Fed.Reg. 14188, and specifically disclaimed that the values arrived at represented "safe" operating limits. *Id.*, 14190. This was simply not, as Judge Tamm states, a proceeding to arrive at an "administrative

The need for reliable fact-finding does not necessarily imply transplanting trial-type procedures. Factual issues in hybrid proceedings tend to be complex scientific or technical ones involving mathematical or experimental data, or other "legislative facts" [4] peculiarly inappropriate for trial-type procedures. Agencies should innovate procedural formats responsive to the new problems created by hybrid rulemaking. Some agencies (such as FDA and EPA) have already begun to do so.[5]

Decisions in areas touching the environment or medicine affect the lives and health of all. These interests, like the First Amendment, have "always had a special claim

---

weighing of risks and benefits of additional reactors," Concur at 7, or to decide "whether licensing an additional reactor is worth the additional environmental risk . . . ." Concur at 5.

[4] *See* 2 Davis, Administrative Law Treatise § 15.03 (1958):

> When a court or an agency finds facts concerning the immediate parties—who did what, where, when, how, and with what motive or intent—the court or agency is performing an adjudicative function, and the facts are conveniently called adjudicative facts. . . .
>
> Stated in other terms, the adjudicative facts are those to which the law is applied in the process of adjudication. They are the facts that normally go to the jury in a jury case. They relate to the parties, their activities, their properties, their businesses. Legislative facts are the facts which help the tribunal determine the content of law and of policy and help the tribunal to exercise its judgment or discretion in determining what course of action to take. Legislative facts are ordinarily general and do not concern the immediate parties.

[5] Judge Tamm raises the specter that the "entirely predictable" response by administrators to "procedural refinements" will be so many adjudicatory procedures that "the advantages of informal rulemaking as an administrative tool are lost in a heap of judicially imposed procedure." Concur

to judicial protection." [6] Consequently, more precision may be required than the less rigorous development of scientific facts which may attend notice and comment procedures.

Despite the controversy surrounding the proper standard of review in informal rulemaking cases, *see* Concur at n.2, there is less disagreement on this essential point than meets the eye. With customary perspicacity, Judge Friendly has observed that often it does not really matter much whether a court says the record is remanded because the procedures used did not develop sufficient evidence, or because the procedures were inadequate.[7] *From*

---

at 6. Adjudicatory forms are no talisman which would guarantee an agency an adequate record.

Moreover, Williams, *"Hybrid Rulemaking" Under the Administrative Procedure Act: A Legal and Empirical Analysis*, 42 U.CHI.L.REV. 401 (1975), points out that the hybrid rulemaking cases have not in fact had that kind of impact on agency behavior. *Id.*, 425, 428, 448. Contrary to Judge Tamm's statement that cross-examination afforded only delay and something to be traded off for "substantative concessions," Concur at n.6, Williams actually discovered that the parties were able to agree on *procedural* innovations which better met their needs and were less time-consuming than cross-examination. *See* Majority Op., *supra* note 28.

[6] Environmental Defense Fund, Inc. v. Ruckelshaus, 439 F.2d 584, 598 (D.C.Cir. 1971) (Bazelon, C.J.). *See also* Leventhal, *Environmental Decisionmaking and the Role of the Courts*, 122 U.PA.L.REV. 509, 512-13 (1974).

[7] In discussing the article by Judge Wright, *supra* note 2, on which the concurrence relies, Judge Friendly writes:

> A judge not in the arena must wonder whether the war Judge Wright is waging with his colleagues is not in some degree semantic. . . . One can hardly quarrel with the conclusion that if a reviewing court finds that the procedures followed by the agency in adopting a rule have not produced a body of evidence enabling it to pronounce the required benediction, the court must remand. . . . It is thus not too consequential whether a court invalidates a rule on the ground that the procedures have

the standpoint of the administrator, the point is the same: the procedures prescribed by § 553 will not automatically produce an adequate record. Thus, although Judge Tamm vehemently opposes the concept of procedural review of informal rulemaking, he agrees to send this case back for a fuller development of the facts *even though the dictates of § 553 were followed.*[8]

Of course, important differences remain *from the standpoint of a reviewing court.* I am convinced that in highly technical areas, where judges are institutionally incompetent to weigh evidence for themselves, a focus on agency procedures will prove less intrusive, and more likely to improve the quality of decisionmaking, than judges "steeping" themselves "in technical matters to determine whether the agency has exercised a reasoned discretion." *See Ethyl Corp.* v. *EPA*, No. 73-2205 (D.C.Cir., March 19, 1976)

> not developed substantial evidence to support it or even evidence adequate to rebut a claim that it is arbitrary and capricious, or, instead, takes the route of prescribing ad hoc procedural requirements in addition to those of section 553. . . . Both roads lead to the conclusion that an administrator engaged in rulemaking governed by the APA cannot always be sure that rudimentary notice and comment procedures, even if they measure up to Judge Wright's salutary specifications, will always suffice.

Friendly, *Some Kind of Hearing*, 123 U.PA.L.REV. 1267, 1313-14 (1975) [footnotes omitted].

[8] The logic of Judge Tamm's position that the "deficiency" here is not with the procedures used to make a record, just with the "record generated," Concur at 2, totally escapes me.

Judge Tamm also criticizes the court for failing to tell the Commission "in precise terms" how to achieve a "thorough ventilation" of the factual issues. Concur at 3. He apparently finds greater specificity in an instruction to the Commission to provide "an explanation of the basis" of its conclusions. Concur at 7.

(en banc) (Bazelon, C.J., concurring), *cert. denied*, 44 U.S.L.W. 3719 (June 10, 1976).[9]

---

[9] *Cf.* Lathan v. Brinegar, 506 F.2d 677, 693 (9th Cir. 1974) (en banc):

> We think that the courts will better perform their necessarily limited role in enforcing NEPA if they apply [the "without observance of procedure required by law" standard of 5 U.S.C.] § 706(2)(D) in reviewing environmental impact statements for compliance with NEPA than if thy [sic] confine themselves within the straight jacket of [the "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law" standard of 5 U.S.C.] § 706(2)(A).

See also Ohio v. Wyandotte Chem. Corp., 401 U.S. 493, 504 (1971) (original jurisdiction declined in pollution case involving complex, novel and technical factual questions):

> . . . Ohio is raising factual questions that are essentially ones of first impression to the scientists. The notion that appellate judges, even with the assistance of a most competent Special Master, might appropriately undertake at this time to unravel these complexities is, to say the least, unrealistic. Nor would it suffice to impose on Ohio an unusually high standard of proof. That . . . would not lessen the complexity of the task of preparing responsibly to exercise our judgment, or the serious drain on the resources of this Court it would entail.

TAMM, *Circuit Judge, separate statement concurring in result*:

Licensing a nuclear reactor unquestionably constitutes a "major Federal action[] significantly affecting the quality of the human environment" requiring a "detailed" environmental impact statement under section 102 (2) (C) of NEPA, 42 U.S.C. § 4332(2) (C) (1970). Approval of such a facility, which inevitably will produce high level radioactive wastes, some of which must be isolated from the "biosphere" for a quarter of a million years, undeniably necessitates an "irreversible and irretrievable commitment[] of resources" within the meaning of the Act. 42 U.S.C. § 4332(2) (C) (v). A panel of this court has previously indicated that NEPA requires potential environmental problems of this magnitude to be dealt with in advance of such a substantial commitment, not ignored until new commitments inevitably follow from the old. *See, e.g., Calvert Cliffs' Coordinating Comm. v. AEC*, 449 F.2d 1109, 1128 (D.C. Cir. 1971).[1] I agree with the majority that NEPA requires the Commission fully to assure itself that safe and adequate storage methods are technologically and economically feasible. It forbids reckless decisions to mortgage the future for the present, glibly assuring critics that technological advancement can be counted upon to save us from the consequences of our decisions. I further agree with the conclusion of the majority that it is impossible to determine from the record before us whether the Commission has fulfilled its statutory obli-

[1] A major purpose of NEPA was to avoid the limiting effect of incremental decisionmaking by confronting environmental problems before foreclosing alternative methods of dealing with them. *See* S. Rep. No. 296, 91st Cong., 1st Sess. 5 (1969), *quoted in* Majority 9. To this end, NEPA requires a thorough cost-benefit study in each case before undertaking major federal action affecting the quality of the human environment. Calvert Cliffs' Coordinating Comm. v. AEC, *supra* at 1128.

gation under NEPA in adopting the S-3 table, in effect deciding that the incremental environmental effect of storing the waste of an additional nuclear reactor is negligible, or whether it has uncritically adopted as its own the undocumented conclusions of a single witness that the waste storage issue is a "non-problem" with which the Commission need hardly concern itself at this time. Accordingly, the inadequacy of the record demands that we remand this case to the Commission in order to ensure that it has taken a hard look at the waste storage issue. I cannot, however, without qualification, endorse the approach the majority has taken to reach this result or its suggested disposition on remand.

The majority appears to require the Commission to institute further procedures of a more adversarial nature than those customarily required for informal rulemaking by the Administrative Procedure Act, 5 U.S.C. § 553 (1970).[2] The Commission chose to proceed by "hybrid" rulemaking below, allowing petitioners to present oral arguments before the Commission and subjecting participants to questions, but not permitting participants to cross-examine. Majority note 59. By so proceeding the Commission exceeded the minimum procedural requirements of section 553.[3] In my view, the deficiency

[2] The standard of review under section 553 has been the subject of considerable discussion in recent years, especially within this judicial circuit. *See, e.g.*, the cases and articles cited in Majority note 23.

[3] Section 553 imposes only three obligations on the rulemaker. First the rulemaker must give adequate and effective notice of "either the terms or substance of the proposed rule or a description of the subjects and issues involved." Secondly, he must "give interested persons an opportunity to participate . . . through submission of written data, views, or arguments with or without opportunity for oral presentation." Finally, the rulemaker must "incorporate in the rules adopted

is not with the *type* of proceeding below, but with the completeness of the record generated.[4] More procedure will not, in this case, guarantee a better record, and a better record can be generated without reopening the oral proceeding at this time. We cannot conclude confidently from this record whether the Commission's staff considered all relevant factors, including the facts petitioners call to our attention, in reaching the figures embodied in Table S-3; nor can we conclude from Dr. Pittman's oral statements, substantially devoid of documentation, whether these figures represented conclusions drawn from more exhaustive research into the waste storage problem conducted by the head of the Commission division charged with this task. If Dr. Pittman's conclusions were so based, I believe the Commission is entitled to accept them, provided, of course, it is assured that they are reasonably objective.[5]

---

a concise and general statement of their basis and purpose." 5 U.S.C. § 553 (1970). *See generally* Verkuil, *Judicial Review of Informal Rulemaking*, 60 VA. L. REV. 185 (1974).

The "concise and general statement" required by section 553 must be sufficiently complete and detailed to enable the court to accomplish its reviewing function, assuring itself that the agency has engaged in reasoned decisionmaking, has given serious thought to alternative rulings, and has provided reasoned explanations for controversial normative and empirical determinations. In short, "the reviewing court must satisfy itself that the requisite dialogue occurred and that it was not a sham." Wright, *The Courts and the Rulemaking Process: The Limits of Judicial Review*, 59 CORNELL L. REV. 375, 381 (1974).

[4] The majority also recognizes that the procedures utilized by the Commission might suffice "if administered in a more sensitive, deliberate manner." Majority 40.

[5] *See* Environmental Defense Fund, Inc. v. Corps of Engineers, 470 F.2d 289 (8th Cir.), *cert. denied*, 412 U.S. 931 (1972), in which the Eighth Circuit Court of Appeals held that, although NEPA requires agencies to evaluate objectively

I am also troubled by two other aspects of the majority opinion. First, I am distressed because I believe the majority opinion fails to inform the Commission in precise terms what it must do in order to comply with the court's ad hoc standard of review.[6] The majority sends the waste storage issue back to the Commission for a "thorough ventilation." This language, of course, means very little in procedural terms. In order to aid the Commission in filling in the gaps in the record, the majority enumerates a number of procedural alternatives in varying degrees of formality, some less intrusive into agency prerogatives than others. Majority 39. Then, heeding the Supreme Court's admonition in *FPC v. Transcontinental Gas Pipe Line Corp.*, 96 S.Ct. 579 (1976) (per curiam), that we may not, except in extraordinary circumstances, specify agency procedures on remand, the majority declines to give the Commission any direction as to which procedure or combination of them, will suffice. The Commission is thus left to decide which to adopt, further confused by the majority's statement that, "It may be that no combination of the procedures mentioned above will prove adequate, and the agency will be required to develop new procedures to accomplish the innovative task of implementing NEPA through rulemaking." Majority 39. Such specificity resembles a

---

their projects, it does not require agency officials to be subjectively impartial. In other words,

> NEPA assumes as inevitable an institutional bias within an agency . . . and erects the procedural requirements of § 102 to insure that there is no way the decision-maker can fail to note the facts and understand the various arguments advanced by the plaintiffs if he carefully reviews the entire environmental impact statement.

Id. at 295 (quotation marks and citation omitted).

[6] Judicial imposition of procedural requirements on an ad hoc basis is criticized in Wright, *supra*.

standardized test in which there are numerous possible answers, including "all of the above," "none of the above," or "various combinations of the above." The result, I believe, is entirely predictable: the Commission may or may not adopt one of the majority's suggestions, but will in any case seek to comply by mechanically generating more "negative" information respecting current problems with disposal of high level radioactive wastes and then will "overcome" this information with citations to favorable studies and articles. Ultimately, of course, the Commission must decide which information to accept and which to reject, regardless of the type of procedure used. The majority opinion appears to recognize as much when it volunteers that, "On the other hand, the procedures the agency adopted in this case, if adminstered in a more sensitive, deliberate manner, might suffice." Majority 40 (citation omitted). This time, however, the decision whether licensing an additional reactor is worth the additional environmental risk would be one of policy or risk assessment and, consequently, would be reviewable only according to the customary "arbitrary, capricious" standard. *Amoco Oil Co. v. Environmental Protection Agency*, 501 F.2d 722, 741 (1974). I believe it almost inevitable that, after fully considering the problems and alternative methods of waste disposal and storage, the Commission will reach the same conclusion and therefore see little to be gained other than delay from imposing increased adversarial procedures in excess of those customarily required.[7]

[7] It has been argued that those cases in which we have granted a limited right of cross-examination on remand have afforded little relief other than delay and a tool with which to bargain for substantive concessions. Williams, *"Hybrid Rulemaking" Under the Administrative Procedure Act: A Legal and Empirical Analysis*, 42 U. CHI. L. REV. 401, 436-48. It would seem, therefore, that the right of cross-examination at a rulemaking proceeding frequently is better to have and be denied than to utilize.

This brings me to my second, related concern with the majority's approach. I believe the majority's insistence upon increased adversariness and procedural rigidity, uneasily combined with its non-direction toward any specific procedures, continues a distressing trend toward over-formalization of the administrative decision-making process which ultimately will impair its utility. As Judge Wright has recently noted, the administrative response to overuse of judicial imposition of such ad hoc procedural refinements is easily foreseeable. Fearing reversal, administrators will tend to over-formalize, clothing their actions "in the full wardrobe of adjudicatory procedures," until the advantages of informal rulemaking as an administrative tool are lost in a heap of judicially imposed procedure. Wright, *The Courts and the Rulemaking Process: The Limits of Judicial Review*, 59 CORNELL L. REV. 375, 387-88 (1974).[8] The majority's

[8] A further problem with over-reliance on the hybrid rulemaking approach has its roots in the hostility of some judges to all forms of substantive review of agency decisions. The line between substantive and procedural review is, of course, a hazy one. The same judges who most vehemently protest against judicial intrusions into the substance of administrative action, especially in highly technical areas, may not hesitate to require relatively more procedure of an agency when they dislike its substantive result. There is, I believe, a danger that judges will feel less restrained in requiring agencies to adopt procedures in excess of those required by the APA when review is couched in procedural, rather than substantive, terms. The preoccupation of the majority opinion in this case with the half-life of the plutonium atom and the myriad of geological and other technical difficulties one faces in attempting to safely store a highly toxic substance for a quarter of a million years demonstrates that judges cannot avoid the task of immersing themselves in difficult and often technical matters in order to evaluate administrative action and assure themselves that the agency has in fact dealt with all major issues. Because the relative environmental importance of the waste disposal issue before us is the subject of some

reliance upon the so-called "hybrid rulemaking" cases[9] for its conclusion that the procedures prescribed by section 553 are inadequate for resolution of the complex issues involved in this case and its insistence that the Commission adopt more formal adversary procedures are, I believe, misplaced. Admittedly, there are rare cases in which "basic considerations of fairness" require procedures more adversarial than those prescribed by section 553. *See* Majority 14-15, *quoting from* Respondent's Brief at 13-14. I cannot agree, however, that this case requires us to reach this issue. Remanding an agency decision with instructions to initiate such procedures is an extraordinary judicial remedy which, I believe, should be reserved for extraordinary cases.

The appropriate remedy at this point is not to impose ad hoc procedural requirements in an attempt to raise the level of petitioners' participation, already adequate under section 553, but to remand for an explanation of the basis of Dr. Pittman's statements and of the staff's numerical conclusions,[10] *i.e.* for the documentation which the majority finds so conspicuously lacking.[11] The

---

controversy, arguments about whether our focus here is "procedural" or "substantive" may be more semantic than determinative.

[9] *See* the cases cited at note 23 of the majority opinion.

[10] As the majority states, due process considerations probably mandate that petitioners be allowed to comment upon any additional information assembled by the Commission. Neither the Constitution nor the Administrative Procedure Act, however, directs the Commission to allow additional oral presentation, cross-examination, or any other procedures in addition to those required by section 553.

[11] The extent of the required statement of basis may vary, of course, according to the precise demands and issues of each particular case, but, "[a]t a minimum, the statement should refer to relevant submissions by interested parties and should

Commission should be able to supply the court with a statement of the methods by which its staff arrived at the figures embodied in Table S-3 and by which Dr. Pitt-

---

rebut or accept these submissions in an orderly fashion." Wright, *supra* at 381. This court has also distinguished between factual determinations and policy choices more peculiarly within the expertise of the administrative agency. In the former case, we commonly have insisted upon sufficient attention to the facts to enable the reviewing court to ascertain the underlying rationality of the resultant regulations. Amoco Oil Co. v. Environmental Protection Agency, 501 F.2d 722 (D.C. Cir.), *cert. denied*, 417 U.S. 921 (1974). In contrast,

> [w]here . . . the regulations turn on choices of policy, on an assessment of risks, or on predictions dealing with matters on the frontiers of scientific knowledge, we will demand adequate reasons and explanations, but not "findings" of the sort familiar from the world of adjudication.

Id. at 741.

Often, of course, an agency ruling will encompass both factual determinations and policy choices. This is such a case. For example, the decision to treat the waste storage issue through generic rulemaking because it is common to all licensing decisions is clearly a policy determination within the agency's special expertise which we should review only for clear abuse of discretion. *See* NLRB v. Bell Aerospace Co., 416 U.S. 267 (1974). The decision to license a particular reactor is also a policy or "assessment of risks" decision within the agency's discretion, provided it has adequately considered all underlying factual issues, including the waste storage issue, and has determined to its own satisfaction that safe methods of production and waste storage are already technologically and economically feasible. Finally, once so assured, the decision to postpone until later the question as to which of several feasible methods should be utilized is also, I believe, a policy, or risk assessment, decision.

This case, however, involves related factual determinations for which we must find support in the statement of basis required by section 553. Of particular relevance here is Table S-3, which reduces the environmental effect of licensing an additional reactor to certain numerical values and, in ef-

man concluded that the waste storage problem is already technologically and economically soluable. If it cannot, then we will have no choice but to invalidate the Commission's rule under the "arbitrary, capricious" standard; if it can, we should defer to the administrative weighing of risks and benefits of additional reactors.

---

fect, concludes that it is negligible. The claimed bases for the judgments expressed in numerical terms in Table S-3 are the data assembled by the staff in the draft Environmental Survey, adopted without substantial modification as Table S-3 and thus embodied in the final rule. As the majority indicates, neither the Survey itself, the back-up documentation to which it refers, nor the oral and written testimony offered at the hearing adequately supports these factual conclusions with respect to the waste disposal issue. Majority 21-22. The detailed explanation which characterizes other portions of the Environmental Survey is notably absent from this portion.

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 74-1385

NATURAL RESOURCES DEFENSE COUNCIL, INC., ET AL.,
Petitioners

v.

UNITED STATES NUCLEAR REGULATORY COMMISSION
AND THE UNITED STATES OF AMERICA
Respondents

VERMONT YANKEE NUCLEAR POWER CORP.,
Intervenor

No. 74-1586

NATURAL RESOURCES DEFENSE COUNCIL, INC.
AND CONSOLIDATED NATIONAL INTERVENORS,
Petitioners

v.

UNITED STATES NUCLEAR REGULATORY COMMISSION
AND UNITED STATES OF AMERICA
Respondents

BALTIMORE GAS AND ELECTRIC CO., ET AL.
Intervenors

Filed October 8, 1976

Before: Bazelon, Chief Judge; Edwards*, U.S. Circuit Judge for the Sixth Circuit and Tamm, Circuit Judge.

---

*Sitting by designation pursuant to Title 28 U.S. Code Section 291(a).

ORDER

Upon consideration of the motion of respondents United States Nuclear Regulatory Commission and United States of America for stay of mandate and for correction of this Court's opinion dated July 21, 1976, and of petitioners' opposition thereto, and movants having called to the attention of the Court certain portions of the transcript of the hearing on February 1, 1973, which portions were omitted from the Joint Appendix, it is

ORDERED, by the Court, that respondents' motion for correction of this Court's opinion dated July 21, 1976, is granted in part, and the opinion dated July 21, 1976 is amended as follows:

On page 34, delete lines 3-5.

On page 34, delete footnote 53 and renumber all succeeding footnotes.

On page 41, delete the following from footnote 59: "In this case the board members asked no questions whatsoever of Dr. Pittman. *See supra* note 53."

In all other respects, respondents motion for correction is denied.

Per Curiam

Notice: This opinion is subject to formal revision before publication in the Federal Reporter or U.S. App. D.C. Reports. Users are requested to notify the Clerk of any formal errors in order that corrections may be made before the bound volumes go to press.

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 73-1776

NELSON AESCHLIMAN, ET AL., PETITIONERS

v.

UNITED STATES NUCLEAR REGULATORY COMMISSION AND UNITED STATES OF AMERICA, RESPONDENTS

CONSUMERS POWER CO., A MICHIGAN CORP., INTERVENOR

No. 73-1867

SAGINAW VALLEY NUCLEAR STUDY GROUP, UNITED AUTO WORKERS INTERNATIONAL, CITIZENS COMMITTEE FOR ENVIRONMENTAL PROTECTION OF MICHIGAN, WEST MICHIGAN ENVIRONMENTAL ACTION COUNCIL, INC., SIERRA CLUB AND UNIVERSITY OF MICHIGAN ENVIRONMENTAL LAW SOCIETY, PETITIONERS

v.

UNITED STATES NUCLEAR REGULATORY COMMISSION AND UNITED STATES OF AMERICA, RESPONDENTS

CONSUMERS POWER COMPANY, INTERVENOR

Petitions for Review of Orders of the Nuclear Regulatory Comission

---

Argued November 27, 1974

Decided July 21, 1976

Myron M. Cherry, with whom *Robert L. Graham*, was on the brief for petitioners in No. 73-1867 argued for all petitioners.

James L. Kelley, Attorney, Nuclear Regulatory Commission, with whom *Wallace H. Johnson*, Assistant Attorney General, *Marcus A. Rowden*, General Counsel, Nuclear Regulatory Commission, *Raymond M. Zimmet*, Assistant to the Solicitor, Nuclear Regulatory Commission. *Edmund B. Clark*, *Jacques B. Gelin* and *Lawrence E. Shearer*, Attorneys, Department of Justice, were on the brief for respondents.

Harold F. Reis, with whom *J. A. Bouknight, Jr.*, was on the brief for intervenor Consumer Power Company.

Howard J. Vogel, was on the brief for petitioners in No. 73-1776.

William H. Ward, filed a brief on behalf of the State of Kansas as *amicus curiae* urging reversal.

Before: BAZELON, *Chief Judge*, FAHY, *Senior Circuit Judge* and JUSTICE,* *United States District Judge* for the Eastern District of Texas

Opinion for the Court filed by *Chief Judge* BAZELON.

BAZELON, *Chief Judge*: These cases involve consolidated petitions for review of orders of the U.S. Atomic Energy Commission granting construction permits for two pressurized water nuclear reactors to generate electricity and steam.[1]

---

* Sitting by designation pursuant to 28 U.S.C. § 292(d).

[1] Under the Energy Reorganization Act of 1974, Pub. L. No. 93-438, 88 Stat. 1233, 42 U.S.C. § 5801 *et seq.* (Supp. IV, 1974), the licensing and related regulatory functions of the AEC were transferred to the U.S. Nuclear Regulatory Commission [NRC]; the Energy Research and Development Administration [ERDA] assumed responsibility for the operation of government nuclear research and production facilities. 42 U.S.C. §§ 5841(f), 5842, 5814(c) (Supp. IV, 1974). We employ the term "Commission" to refer to both AEC and its regulatory successor, NRC.

The applicant, Consumers Power Company [Consumers] made its initial application in January, 1969, under the Atomic Energy Act of 1954, as amended, 42 U.S.C. §§ 2133, 2232, 2235, and 2239. Consumers' own system is the primary customer of electricity, while the adjacent facility of the Dow Chemical Company [Dow] was the intended customer of the output of process steam. Location of the twin reactors in Midland, Michigan, across the Tittabawassee River from Dow was dictated, in part, by the fact that steam does not efficiently retain heat over long travels.

Petitioner Aeschliman and five other residents of nearby Mapleton, Michigan, constituting the Mapleton Intervenors, opposed grant of the permits. Similarly in opposition were petitioning organizations, Saginaw Valley Nuclear Study Group, a local not-for-profit environmental organization, et al. [Saginaw].

As required by 42 U.S.C. §§ 2039, 2232(b), the application was referred to the Advisory Committee on Reactor Safeguards [ACRS], and to the Commission staff. In 1970, both ACRS and the staff preliminarily concluded that the facility comported with the Atomic Energy Act's public health and safety standards.

After notice and hearings,[2] a three-member Atomic

---

[2] Seventeen days of hearings were held regarding health and safety issues. Dow and a local civic organization intervened on behalf of the application; the Mapleton and Saginaw intervenors opposed it. Under then-prevailing Commission rules, environmental issues did not have to be considered in a construction permit hearing, and were excluded. On the final day of hearings, this court decided *Calvert Cliffs' Coordinating Committee, Inc.* v. *AEC*, 499 F.2d 1109 (D.C. Cir. 1971),

Safety and Licensing Board issued a lengthy decision authorizing issuance of construction permits. Mapleton and Saginaw intervenors filed exceptions with the Atomic Safety and Licensing Appeal Board. Upon review, the Appeal Board affirmed in all respects, but attached conditions concerning the applicant's "quality assurance" program.[3]

Following the filing of petitions for review, motions seeking reconsideration on various grounds were made and denied.[4]

---

striking down the Commission regulations governing treatment of NEPA issues. Thereafter, the Commission revised its environmental review regulations, and in January, 1972, issued its draft environmental impact statement on the Midland facility. Comments were solicited from federal agencies, groups in the vicinity of the proposed site, and the public. A final environmental impact statement followed in March, 1972. Fourteen days of public hearings on environmental issues were conducted in May and June, 1972. Saginaw did not participate in these latter hearings, but both Mapleton and Saginaw did submit proposed findings of fact and conclusions of law.

[3] The terms "quality assurance" and "quality control" are terms of art defined by 10 C.F.R., Part 50, App. B:

> '[Q]uality assurance' comprises all those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service. Quality assurance includes quality control, which comprises those quality assurance actions related to the physical characteristics of a material, structure, component, or system which provides a means to control the quality of the material, structure, component, or system to predetermined requirements.

[4] These cases have been long delayed. The last decision on the merits by the Appeal Board was rendered May 18, 1973. On July 10, 1973, the Commission declined review. *See* 10 C.F.R. § 2.785(d)(1) (1975). The petitions for review were filed August 6, 1973. On November 6, 1973, the Commission declared a major change in policy regarding energy conserva-

I

A.

Saginaw argues the Environmental Impact Statement [EIS] for construction of the Midland reactors did not adequately consider "alternatives to the proposed action" as required by §§ 102(C)(iii) and 102(D) of the National Environmental Policy Act [NEPA], 42 U.S.C. §§ 4332(C)(iii); *id.*, (D) (1970). In particular, Saginaw asserts the EIS was fatally defective for failure to examine energy conservation as an alternative to a plant of this size. The alternatives section of the EIS discusses several non-nuclear methods of power generation, but does not consider any measures for reducing consumer demand.[5] This omission was forcefully pointed out by

---

tion. Niagara Mohawk Power Corp., RAI-73-11, 995. Petitioners sought clarification by the Commission of the impact of *Niagara* on parallel contentions in their case. This court delayed briefing to permit resolution of that question, and finally ordered the Commission to respond to petitioner's request. The Commission refused to reopen on January 24, 1974. Petitioners made a second motion before the Commission to reopen the matter on the ground that renegotiation of the Consumers-Dow agreement substantially altered elements of the cost-benefit analysis which had permitted construction. That motion was denied on February 5, 1974, and a third, which the Commission deems cumulative with the second, was denied on February 20, 1974. On April 11, 1974, after calling for all relevant contracts, the Commission again affirmed its decisions not to reopen for changed circumstances, noting that Dow still intended substantial takes of electricity and steam, and intended to maintain their fossil-fuel facilities, "primarily on a stand-by basis." These cases were argued together on November 27, 1974. On April 8, 1975, this court entered an order holding them in abeyance pending the decision in NRDC v. NRC, Nos. 74-1385, 74-1586 (D.C. Cir., decided today), which governs certain of the issues. See, *infra* III.

[5] III J.A. XI-1—XI-11.

Saginaw in its comments on the draft EIS.[6]

The Licensing Board rejected energy conservation alternatives as "beyond our province," stating the "real question" was which power generating technology would be superior.[7] On administrative appeal, the Licensing

[6] *See, e.g.*, III J.A. 128, ¶ 47 (promotional advertising); *id.*, 129-30, ¶ 48 (rate structure); *see also id.*, 150, ¶ 87 (air conditioner usage); *id.*, 149, ¶ 85 (generalized need to conserve energy resources).

We need not decide what the result would be if energy conservation had not been brought to the Licensing Board's attention. We note, however, that several courts have considered intervenor's comments to be one factor bearing on the reasonableness of agency discussion of alternatives. Sierra Club v. Morton, 510 F.2d 813, 826 (5th Cir. 1975); North Carolina v. FPC, —— F.2d ——, No. 74-1941 (D.C.Cir. March 24, 1976), slip op. at 9, *petition for cert. filed*, 44 U.S.L.W. 3671 (U.S., May 14, 1976) (No. 75-1657). *Cf.* Maryland-Nat. Capital Park & Planning Comm. v. U.S. Postal Service, 487 F.2d 1029, 1040 n.9 (D.C.Cir. 1973) (whether exhaustion doctrine applies to NEPA left open).

[7] The Licensing Board wrote:

> 48. Intervenors have suggested at various times that the Board must go behind the characterization of "demand" made by the Applicant to determine whether an appropriate alternative to satisfying the demand would be to set limits on particular uses of electricity. The Board declines to do so. So far as appears from the record, the postulated demand is made up of normal industrial and residential use and it is, in our view, beyond our province to inquire into whether the cusomary uses being made of electricity in our society are "proper" or "improper". The suggestion was also made that Applicant is stimulating demand by its advertising. No evidence was offered on this point and absent some evidence that Applicant is creating abnormal demand, the Board did not consider the question.

II J.A. 38.

* * * *

[Continued]

Board's decision not to explore conservation alternatives was affirmed. The Appeal Board held that conservation was implicitly considered in the cost-benefit analysis and demand projections, and that in view of Saginaw's failure to introduce evidence, further discussion was not required under the "rule of reason" enunciated in *NRDC* v. *Morton*, 458 F.2d 827 (D.C.Cir. 1972).[8]

[7] [Continued]

> 70. As noted above, the Board is satisfied that the benefits outweigh the costs. The real question comes with respect to alternatives. Assuming that the power needs are to be met, are there better alternatives? The evidence demonstrates that there are no hydro sites available, that a pumped storage facility would not meet the load needs, that gas is not a viable alternative for power use, and that outside sources are unavailable. (Citation omitted.) The question of alternatives is then boiled down to a choice between nuclear and fossil (either oil or coal) fuel at the proposed location or at some other location.

II J.A. 53-4.

[8] The text of the Appeal Board's discussion of these issues was as follows:

> 3. Saginaw Intervenors . . . contend, in effect, that the Licensing Board should have considered . . . [*inter alia*] the alternative of not constructing the plant at all . . . or embarking on a program to conserve energy; the environmental propriety of the proposed uses of electricity; and the alleged artificial stimulation by advertising of the demand for electricity.
>
> a. Most of these effects and alternatives were in fact considered by the Board. . . . The alternative of not building the plant at all is inherently part of the cost-benefit analysis which was carried out by the Board. . . .
>
> Some of the intervenor's contentions in these exceptions seek to expand the NEPA review well beyond the pale of what we view as required by NEPA. Thus, while the scope of NEPA consideration of alternatives clearly extends beyond those which an agency itself may effectuate (see *Natural Resources Defense Council* v. *Morton*,

Shortly after the Appeal Board decision, the Commission held in Niagara Mohawk Power Corp., RAI-73-11-995 (Nov. 6, 1973), that certain energy conservation issues should be considered in licensing proceedings. Saginaw thereupon appealed to the Commission for "clarification" of the Appeal Board's decision in light of *Niagara*.

---

458 F.2d 827 (D.C.Cir. 1972)), a rule of reason nevertheless applies. *Id.* at 837. Contrary to intervenors' view, and giving effect to that rule, the Board was not required to analyze the use to which Consumers' customers might put the power generated by the Midland plant to ascertain whether that use would have an adverse environmental impact. The Board made a finding that the "postulated demand is made up of normal industrial and residential use" and that it need not inquire into the propriety of such customary uses of electricity. We agree.

. . . .

b. As for the contention that the demand for electricity was artificially stimulated by the applicant's advertising, the Board stated that no evidence had been offered to support that contention; and that absent some evidence that applicant was creating abnormal demand, it [the Board] would not consider the question. We do not believe the Board acted unreasonably.

In re Consumers Power Co., ALAB-123, RAI-73-5-331 at 351-52 (May 18, 1973), I J.A. 38-39. [Footnotes and citations omitted.]

Unfortunately, discussion of energy conservation by both Licensing and Appeal Boards was obscured by conflating two separate arguments advanced by the intervenors. In addition to arguing NEPA required consideration of energy conservation alternatives, the intervenors argued that the alleged "benefits" of the plant should be discounted by the environmental harm which would be done by the products manufactured from the power generated. In particular, the intervenors focused on certain alleged carcinogens produced by the Dow Chemical Co., a large potential customer of the Midland plant. *See, e.g.*, Saginaw Environmental Contentions ¶ 34, III J.A. 118. This "end product" argument is not pressed on appeal.

The Commission responded that before Licensing Boards need explore energy conservation alternatives, intervenors "must state clear and reasonably specific energy conservation contentions in a timely fashion. Beyond that, they have a burden of coming forward with some affirmative showing if they wish to have these novel contentions explored further." In re Consumers Power Co., RAI-74-1-19 at 32 (Jan. 24, 1974), I J.A. 71. The "affirmative showing" required was further elaborated as follows:

> Purported energy conservation issues must meet a threshold test—they must relate to some action, methods or developments that would, in their aggregate effect, curtail demand for electricity to a level at which the proposed facility would not be needed. . . . Beyond that, the issue must pertain to an alternative that is "reasonably available." *Natural Resources Defense Council* v. *Morton*, 458 F.2d 827, 834 (C.A.D.C. 1972). [Footnote omitted.] Furthermore, the impact of proposed energy conservation alternatives on demand must be susceptible to a reasonable degree of proof. Largely speculative and remote possibilities need not be weighed against a convincing projection of demand. Here, as with many other issues under the National Environmental Policy Act of 1969, a rule of reason applies. See *Natural Resources Defense Council* v. *Morton*, *supra*.

Id., 24, I J.A. 63. Measured by these standards, the Commission held Saginaw's comments on energy conservation "fell far short."[9] Saginaw had introduced no

---

[9] *Id.*, 32, I J.A. 71. The Commission does appear to have found one of Saginaw's contentions sufficient to raise an issue under *Niagara*. It related to possible revision of rates by state public utility commissions to discourage increased consumption of electricity. *See id.*, 26-27, I J.A. 65-66. The Commission disposed of this point by declaring "we will not apply *Niagara* retroactively to cases which had progressed to final

evidence demonstrating the feasibility of particular methods of energy conservation, much less evidence indicating that the proposed facility could be eliminated entirely.[10]

---

order and issuance of construction permits before *Niagara* was decided." *Id.*

Admittedly, agencies sometimes apply changes in their discretionary interpretations of their governing statutes only prospectively in order to avoid unfairness to those who have relied on prior pronouncements. *See* Retail Store Union v. NLRB, 466 F.2d 380, 390 (D.C.Cir. 1972); NLRB v. Majestic Weaving Co., 355 F.2d 854, 860-61 (2d Cir. 1966). But that power cannot be stretched to permit disavowal of clear obligations a statute such as NEPA imposes on the agency itself. The Commission had no power to dispense with such consideration of energy conservation as NEPA required as of the time it was enacted in 1969, at least in those cases where the issue had been raised. *See supra* note 6.

[10] Contrary to the Commission's formulation, an alternative cannot be ignored simply because it would not *totally* alleviate the need for a proposed facility:

> . . . Nor is it appropriate, as Government counsel argues, to disregard alternatives merely because they do not offer a complete solution to the problem. If an alternative would result in supplying only part of the energy that the [proposal] would yield, then its use might possibly reduce the scope of the . . . program and thus alleviate a significant portion of the environmental harm attendant on [it].

NRDC v. Morton, 458 F.2d 827, 836 (D.C.Cir. 1972). *See also* NRDC v. Callaway, 524 F.2d 79, 93 (2d Cir. 1975) (EIS must discuss "such alternatives to the proposed action as may *partially* or completely meet the proposal's goal") [emphasis added].

It is sufficient that energy conservation might reduce projected demand for electricity so that a smaller facility, having lesser adverse environmental impact, would be adequate.

B.

Saginaw contends that the "threshold test" applied in this case is inconsistent with NEPA's "basic mandate" to the Commission to "take the initiative" in considering environmental issues. *Calvert Cliffs' Coordinating Comm., Inc.* v. *AEC*, 449 F.2d 1109, 1118-19 (D.C.Cir. 1971). We agree.

In *Calvert Cliffs* the Commission proposed to limit consideration of environmental issues under NEPA to those "which parties affirmatively raise." *Id.*, 1118. This court reversed, pointing out "it is unrealistic to assume that there will always be an intervenor with the information, energy, and money required" to investigate environmental issues. *Id.* The court held that the "primary responsibility" for fulfilling NEPA must lie with the Commission, which may not merely "sit back, like an umpire, and resolve adversary contentions at the hearing stage."[11] *Id. See also Greene County Planning Board* v. *FPC*, 455 F.2d 412, 420 (2d Cir.), *cert. denied*, 409 U.S. 849 (1972). The same considerations persuade us that the Commission may not refuse to consider energy conservation alternatives unless an intervenor first brings forward information satisfying the strictures of its "threshold test."

---

[11] The Commission acknowledged in its opinion that "NEPA imposes upon us an affirmative obligation to develop an adequate record upon which to assess the environmental impact of proposed nuclear plants." RAI-74-1-19 at 31, I J.A. 70. However, the Commission felt it "must nevertheless have workable subsidiary rules for the orderly conduct of these proceedings." *Id.*

The Commission has substantial discretion in the selection of procedures. *See* Siegel v. AEC, 400 F.2d 778, 786 (D.C. Cir. 1968). However, we do not believe the asserted interest in orderly proceedings goes so far as to justify the heavy substantive burdens placed on intervenors, contrary to *Calvert Cliffs*.

The Commission derived the "threshold test" from the "rule of reason" courts use in reviewing the sufficiency of the alternatives considered in an EIS. *NRDC* v. *Morton*, 458 F.2d 827, 834 (D.C.Cir. 1972). *See also Carolina Environmental Study Group* v. *U.S.*, 510 F.2d 796, 800-801 (D.C.Cir. 1975); *NRDC* v. *Callaway*, 524 F.2d 79, 92 (2d Cir. 1975). Thus, for example, agencies are not required to consider alternatives which are "remote and speculative," *Life of the Land* v. *Brinegar*, 485 F.2d 460 (9th Cir. 1973), *cert. denied*, 416 U.S. 961 (1974), but may deal with circumstances "as they exist and are likely to exist." *Carolina Environmental Study Group* v. *U.S.*, *supra*, 510 F.2d at 801.

The Commission properly recognized that such judgments present mixed questions of law and fact which can only be intelligently resolved based on a factual record.[12] But the need to assemble data bearing on whether alternatives are promising enough to merit detailed consideration in the EIS does not mean the entire burden of compiling such information can be placed on the intervenors. In light of the allocation of responsibility established by *Calvert Cliffs*, we believe the Commission erred in promulgating a "threshold test" which essentially requires intervenors to prove an alternative satisfies the "rule of reason" before the Commission will investigate it.

In our view, an intervenor's comments on a draft EIS raising a colorable alternative not presently considered

[12] The decision that a technological or other development is a "realistic" alternative which merits full consideration in an EIS ought not turn on the intuition of "technically illiterate" judges that it is "reasonable." *Cf.* Ethyl Corp. v. EPA, No. 73-2205 (D.C.Cir. March 19, 1976) (en banc) (Bazelon, C.J., concurring). Nor, of course, should factual submissions bearing on the "reasonablenss" of alternatives be presented to the court in the first instance. *Cf.* Camp v. Pitts, 411 U.S. 138 (1973).

therein must only bring "sufficient attention to the issue to stimulate the Commission's consideration of it."[13] Thereafter, it is incumbent on the Commission to undertake its own preliminary investigation of the proffered alternative sufficient to reach a rational judgment whether it is worthy of detailed consideration in the EIS. Moreover, the Commission must explain the basis for each conclusion that further consideration of a suggested alternative is unwarranted. An explicit statement is essential to enable the parties to challenge the agency's action through motions for reconsideration, and to facilitate judicial review. The preliminary investigation of an alternative to determine whether it merits further consideration need not be nearly as detailed as that required regarding alternatives which are considered in the EIS. Often a short explanation will suffice.[14] It is not "oner-

[13] The phrase is drawn from our recent decision in Indiana & Michigan Elect. Co. v. FPC, 502 F.2d 336, 339 (D.C.Cir. 1974), *cert. denied*, 420 U.S. 946 (1975), a case concerned with the requirements of § 313(b) of the Federal Power Act, 16 U.S.C. § 825*l*(b) (1970), that objections be presented in an application for rehearing. The form of words used is not all important. The Commission's opinion in this case suggested a standard which would probably suffice as well: a "showing . . . sufficient to require reasonable minds to inquire further." RAI-74-1-19 at 32 n.27, I J.A. 71. This does not, however, support the imposition of the burden of an affirmative evidentiary showing.

[14] A suggested alternative may be essentially redundant, or merely a minor variation of approaches already considered. Or preliminary investigation may indicate that it is impractical, or that meaningful information regarding it is not available.

Where the discussion of alternatives in an EIS is "sufficient to permit a reasoned choice," NRDC v. Morton, *supra*, 458 F.2d at 836, "an EIS does not become vulnerable because it fails to consider each and every conceivable variation of the alternatives stated." Brooks v. Coleman, 518 F.2d 17, 19 (9th Cir. 1975).

ous" for an agency, as well as a court, to state its reasons "if the matter was dealt with in a conscientious manner in passing on the merits." *See Davis* v. *Clark*, 404 F.2d 1356, 1358 (D.C. Cir. 1968) (separate opinion of Tamm, J.).

C.

In the instant case, Saginaw's comments were adequate to "stimulate the Commission's consideration" of energy conservation alternatives. Saginaw identified in a general way the measures it believed merited consideration, and their relationship to the objectives of the project. Of course, if energy conservation generally were already being considered in an EIS, more detailed comments might be required to focus the Commission's attention on specific techniques. *See North Carolina* v. *FPC*, *supra* note 6.

Energy conservation was clearly a "colorable" alternative relevant to the goals of the project. The FPC routinely requires that applications to build hydroelectric facilities include an environmental report discussing "the potential for accomplishing the proposed objectives through energy conservation" as well as through alternative energy sources. 18 C.F.R. App. A § 8.2 (1975), 38 Fed. Reg. 15946, 15949 (June 19, 1973). Moreover scholars and government officials are almost unanimous that energy conservation will have an important, although not decisive, role in overall energy policy in coming decades.[15] It follows that energy conservation was

[15] *See, e.g.*, Nuclear Energy, Report of the 15th American Assembly (April 22-25, 1976), at 5. This three day symposium on the future of nuclear energy brought together 62 eminent participants from government, industry and the academic community under the auspices of Columbia University. The group reached a general consensus on the following conclusions, *inter alia*:

not to be dismissed by the Commission without inquiry or explanation.

Nor are we persuaded by the argument advanced by the Appeal Board that energy conservation was implicitly considered in the cost-benefit analysis or demand projections. *See supra* p. 7. In enacting §§ 102(C)(iii) and 102(D) of NEPA Congress required *explicit* consideration of "alternatives to the proposed action." Express consideration of other approaches to a problem places a proposed action in perspective for both the immediate decisionmaker and the public.[16]

2. Although there was considerable sentiment that overall energy growth rate should be cut down through more efficient use and conservation of energy, it was felt that some growth, possibly as low as 1.5 percent, annually, but probably higher, would occur. For electric power demand, it was felt that although the growth rate would probably be less than the "historic" growth rate of 7 percent, it was unlikely to be less than 5 to 5.5 percent, in view of the need to substitute electrical energy for some present uses of oil and gas.

3. Substantial savings can and should be made through energy efficiency improvements and a strong conservation program. Savings through voluntary action alone, although important, are likely to be limited. Some mandatory controls are essential, despite undoubted difficulties in administering such controls effectively and fairly. Market factors will have some impact, especially on commercial and industrial consumption, but they should be supplemented by tax and other incentives. In the case of individual consumption evidence to date suggests energy demands in the United States may not be strongly dependent on price in the short-run.

[16] *Cf.* EDF v. Corps. of Engineers (Tennessee-Tombigbee), 492 F.2d 1123 (5th Cir. 1974), in which the court rejected the suggestion that alternatives need not be considered where the environmental benefits of a project outweigh its costs. The court stated: "the Congressional mandate to develop alternatives would be thwarted by ending the search for other

We hold that rejection of energy conservation on the basis of the "threshold test" was capricious and arbitrary for the reasons heretofore stated. Remand for further proceedings on this and other issues discussed hereafter is therefore necessary.

II

A.

Saginaw also contends that the Commission erred by refusing to permit inquiry into the safety conclusions of the Advisory Committee on Reactor Safeguards [ACRS]. ACRS is a group of outside experts charged by statute to "make reports . . . with regard to the hazards of proposed or existing reactor facilities and the adequacy of proposed reactor safety standards." 42 U.S.C. § 2039 (1970). *See Siegel* v. *AEC*, 400 F.2d 778, 780 (D.C.Cir. 1968). Pursuant to 42 U.S.C. § 2232(b), each application for a construction permit or operating license for a commercial nuclear power generating facility must be reviewed by ACRS and a report "made . . . available to the public except to the extent that security classification prevents disclosure." *Id.*

---

possibilities at the first proposal which establishes an ecological plus, even if such a positive value could be demonstrated with some certainty." *Id.*, 1135.

Demand projections based on historical growth rates are not an adequate substitute for explicit consideration of alternatives such as energy conservation. *Cf.* Carolina Environmental Study Group v. U.S., *supra*. There petitioners argued the EIS should have discussed "at greater length the alternatives of no power, less power, and other means of power generation." 510 F.2d at 800. Although the court had already concluded "Duke's prior forecasts of future demand" had been extremely accurate, *id.*, the court found it necessary to go on to examine the discussion of alternatives in the EIS, *id.*, 801, and found it adequate under the "rule of reason" in the circumstances therein.

The ACRS report in this case was a 5 page, single-spaced typewritten letter. In language accessible to the determined layman, the ACRS report discusses roughly half a dozen design problems raised by the Midland reactors, and recommends modifications to alleviate them."[11] Following discussion of these specific problems, the ACRS report concludes:

> *Other problems* related to large water reactors have been identified by the Regulatory Staff and the ACRS and cited in previous ACRS reports. The Committee

---

[11] IV J.A. 93-98. Changes suggested by ACRS are almost always voluntarily adopted by the applicant. While ACRS *approval* (as opposed to scrutiny) is not required by law before a license issues, "in practice it is very unlikely that an applicant would persist in going before [the Licensing Board] over their objection." Union of Concerned Scientists v. AEC, 499 F.2d 1069, 1073 n.5 (D.C.Cir. 1974).

An example of the nature of the ACRS report is the following:

> The Committee has commented in previous reports on the development of systems to control the buildup of hydrogen in the containment which might follow in the unlikely event of a major accident. The applicant proposes to make use of a technique of purging through filters after a suitable time delay subsequent to the accident. However, the Committee recommends that the primary protection in this regard should utilize a hydrogen control method which keeps the hydrogen concentration within safe limits by means other than purging. The capability for purging should also be provided. The hydrogen control system and provisions for containment atmosphere mixing and sampling should have redundancy and instrumentation suitable for an engineered safety feature. The Committee wishes to be kept informed of the resolution of this matter.

IV J.A. 97.

A supplemental ACRS report was also prepared several months later addressing several additional problems. IV J.A. 99-100.

> believes that resolution of these items should apply equally to the Midland Plant Units 1 & 2.
>
> The Committee believes that the above items can be resolved during construction and that, if due consideration is given to these items, the nuclear units proposed for the Midland Plant can be constructed with reasonable assurance that they can be operated without undue risk to the health and safety of the public.

IV J.A. 97-98 [emphasis added].

Pointing out that it could not determine what "[o]ther problems" the ACRS had in mind, or what "resolution" of them it had suggested, Saginaw requested the Licensing Board to permit discovery into these matters. Saginaw's discovery requests took the form of 337 interrogatories, various document demands, subpoenas, and requests for depositions directed to ACRS members. These requests were all denied, for essentially two reasons. First, it was stated that "the ACRS letter is only admitted as part of the record to show compliance with the statutory requirements . . . ." RAI-74-5-331 at 340. Second, the Commission had indicated in another case that it would be inappropriate to probe the reasoning of individual ACRS members. *Id.*, 340 & n. 62.

We agree with Saginaw that further explication of the ACRS report was necessary, but agree with the Commission that discovery from individual ACRS members was not the proper way to obtain it.

B.

The role Congress intended for ACRS clearly emerges from its legislative history. In 1957, ACRS was added to the Atomic Energy Act of 1954 by Pub.L. 85-256, 71 Stat. 579. Prior to that time, the Commission had established its own "Committee on Reactor Safeguards." *See* S.Rep. No. 296, 85th Cong., 1st Sess., 1957 U.S.Code

Cong. & Admin. News 1803, 1813 [hereafter USCCAN]. However, in 1956, the Commission issued the construction permit litigated in *Power Reactor Development Co.* v. *Int'l Union of Elect. Workers*, 367 U.S. 396 (1961), despite an adverse committee report which had not been made public. *See Union of Concerned Scientists* v. *AEC*, 499 F.2d 1069, 1073 n.5, 1075 n.13 (D.C.Cir. 1974). Aroused by this incident, Congress gave ACRS an independent statutory existence and required that its reports be made public. *Id.*

The Commission opposed making a public ACRS report a "formal statutory requirement." USCCAN at 1816. However, noting the "great prestige" and credibility which the Reactor Safeguards Committee enjoyed in the eyes of the public, the Joint Committee on Atomic Energy stated:

> The report of the [ACRS] committee is to be made public *so that all concerned may be apprised of the safety or possible hazards of the facility.* It is the belief of the Joint Committee that when the public is adequately and accurately informed that it will be in a better position to accept the construction of any reactors.

USCCAN 1825, 1826 [emphasis added]. The statute established ACRS "as part of the administrative procedures in chapter 16 of the act" to provide the "same type of scrutiny and prestige" as the Reactor Safeguards Committee had in the past. USCCAN at 1825. As part of its mandate, ACRS also was to "advise the Commission with respect to the hazards involved at any facility" and to "insure that any features of new reactors would be as safe as possible." *Id.*

The ACRS report in this case must be evaluated in light of the congressional purposes. While the reference to "other problems" identified in previous ACRS reports

may have been adequate to give the Commission the benefit of ACRS members' technical expertise, it fell short of performing the other equally important task which Congress gave ACRS: informing the *public* of the hazards. At a minimum, the ACRS report should have provided a short explanation, understandable to a layman, of the additional matters of concern to the committee, and a cross-reference to the previous reports in which those problems, and the measures proposed to solve them, were developed in more detail. Otherwise, a concerned citizen would be unable to determine, as Congress intended, what other difficulties might be lurking in the proposed reactor design. Since the ACRS report on its face did not comply with the requirements of the statute, we believe the Licensing Board should have returned it *sua sponte* to ACRS for further elaboration of the cryptic reference to "other problems." [18]

Turning to the propriety of discovery directed to individual ACRS members and ACRS documents, we conclude it was not error to deny these requests. ACRS' unique role as an independent "part of the administrative procedures in chapter 16 of the act," *supra*, is sufficiently analogous to that of an administrative decisionmaker to bring into play the rule that the "mental processes" of such a "collaborative instrumentalit[y] of justice" are not ordinarily subject to probing. *United States* v. *Morgan*, 313 U.S. 409, 422 (1941). This rule is particularly apropos in light of ACRS's collegial composition such that no individual may speak for the group as a whole. Where an ACRS report on its face omits material

[18] This is not to say that an ACRS report must contain detailed factual findings of the kind necessary to aid judicial review. Under Commission rules, when ACRS conclusions are controverted, a factual record is compiled anew before the Licensing Board. *See* 10 C.F.R., pt. 2, App. A, V(f)(1) (1976).

information, the appropriate course is not discovery but to return it for supplementation. *Cf. Dunlop* v. *Bachowski*, 421 U.S. 560, 574-75 & n. 11 (1975). We merely hold here that neither the Atomic Energy Act nor general principles of administrative law required the Commission to grant Saginaw's discovery requests.[19]

On remand, the ACRS report should be returned to the ACRS for clarification of the ambiguities noted above.

III

The fuel cycle issues in these cases are controlled by *Natural Resources Defense Council* v. *United States Nuclear Regulatory Commission*, —— F.2d ——, Nos. 74-1385 & 74-1586, (D.C.Cir., decided today). The final EIS prepared in regard to Midland plant units 1 & 2 says only that fuel wastes will be shipped to unidentified offsite disposal areas. On remand, the Commission shall undertake appropriate consideration of waste disposal and other unaddressed fuel cycle issues, and restrike the cost-benefit analysis, as necessary, in accordance with *NRDC* v. *NRC*, *supra*.

As this matter requires remand and reopening of the issues of energy conservation alternatives as well as recalculation of costs and benefits, we assume that the Commission will take into account the changed circumstances regarding Dow's need for process steam, and the intended continued operation of Dow's fossil-fuel generating facilities.[20]

[19] The case as presented calls upon the court to make no decision whether the Federal Advisory Committee Act, 5 U.S.C. App. I § 10(b) (Supp. III, 1973), entitles a party upon proper request to have access to data which were before the ACRS.

[20] This court has previously addressed factors to be considered in reanalysis of costs and benefits in the context of a

IV.

Petitioners' other contentions must be rejected for lack of support in the record, or because prior decisions have concluded the issue unfavorably to petitioners.[21] The

---

derating license amendment calling for continued operation at a lower level:

> An alternative to be considered is complete abandonment of the project, just as it was at both the construction and full-power operating license stages. [citation to record omitted]. As at those stages, sunk costs are not appropriately considered costs of abandonment, although replacement costs may be if construction of a substitute facility could reasonably be expected as a consequence of abandonment.

Union of Concerned Scientists v. AEC, 499 F.2d 1069, 1084 n.37 (D.C.Cir. 1974).

[21] We conclude that the Appeal Board's treatment of the "quality assurance" and "quality control" requirements was adequate, and, particularly in light of the considerations and conditions set out in its orders, should not now be set aside.

The question of the propriety of using a generic rulemaking proceeding to determine standards governing Emergency Core Cooling Systems (for all like reactors) has been concluded unfavorably to petitioners by Union of Concerned Scientists v. AEC, 499 F.2d 1069 (D.C. Cir., 1974).

Mapleton Intervenors raise alleged weaknesses in the final EIS concerning data on the fogging and icing problems caused by the facility's proposed 880-acre cooling pond. Here, the Licensing Board directed, and the Appeal Board affirmed, I J.A. 47, applicant Consumers to conduct a study of fogging and icing in its required ecological surveillance program. The Commission is free to reassess this problem on remand, but it has received sufficient study that the court is not impelled to order that it be done.

With respect to petitioners' complaint that inadequate attention has been given to the possibility of a Class 9 breach of containment or other accident, *see* Carolina Environmental Study Group v. United States, 510 F.2d 796, 799-800 (D.C. Cir. 1975); Ecology Action v. United States Atomic Energy Commission, 492 F.2d 998, 999 (2nd Cir. 1974).

orders granting construction permits for the Midland reactors are hereby remanded for further proceedings in conformity with our opinion.

So ordered.

DOCKET No. 50-271

ALAB-56

IN THE MATTER OF VERMONT YANKEE NUCLEAR POWER CORPORATION (VERMONT YANKEE NUCLEAR POWER STATION)

Issued June 6, 1972

ATOMIC SAFETY AND LICENSING APPEAL BOARD:
SIDNEY G. KINGSLEY, *Chairman.*
DR. JOHN H. BUCK.
DR. LAWRENCE R. QUARLES.

MEMORANDUM AND ORDER

During the course of extended hearings for the issuance of an operating license for this nuclear power station,[1] the Atomic Safety and Licensing Board has referred to us on December 29, 1971, under Subsection 2.730(f) of the Rules of Practice, 10 CFR Part 2, certain rulings concerning the scope of environmental review under 10 CFR Part 50, Appendix D, as revised September 9, 1971.[2]

The referral by the Licensing Board does not explicitly identify the questions to which it seeks answers. It cites the Board's rulings at certain pages of the transcript. Those rulings refer in general terms to proceedings which we have sought out in the record.

[1] The provisional construction permit was issued on December 11, 1967.

[2] 36 Fed. Reg. 18071. See also 36 Fed. Reg. 18716, September 21, 1971; 36 Fed. Reg. 19153, September 30, 1971; 36 Fed. Reg. 21579, November 11, 1971; 36 Fed. Reg. 23900, December 16, 1971; 37 Fed. Reg. 864, January 20, 1972; 37 Fed. Reg. 9619, May 13, 1972; 37 Fed. Reg. 9779, May 17, 1972.

The referral originated in a motion of the intervenors Natural Resources Defense Council, Inc. (NRDC). It has two principal aspects:

a. The Board has referred to us oral rulings in which it sustained objections to questions and to interrogatories concerning the levels of radioactivity and the associated hazards which might be included in the operations of a reprocessing plant to which irradiated fuel from the Vermont Yankee plant might ultimately be sent for reprocessing, and the transportation of high level radioactive wastes from such a reprocessing plant to an ultimate storage area.

b. The Board has also referred a motion of NRDC which requested that, under Subsection 2.785(d) of the Rules of Practice, the substantive questions be certified to the Atomic Energy Commission on the asserted ground that a broad policy question is involved which should be determined by the Commission.

The original motion of NRDC sought orders of the Licensing Board which would open for consideration in the proceeding the environmental impact of spent fuel transportation and reprocessing, the disposition and ultimate storage of high level wastes, and the disposal of the contaminated structures of the nuclear generating station at the end of its useful life when it is decommissioned.

The Licensing Board denied the motion of NRDC, which, after the decision in *Calvert Cliff's Coordinating Committee, Inc.* v. *Atomic Energy Commission,* 449 F.2d 1109 (D.C. Cir. 1971), presented its "Renewed Motion . . . for Full Consideration of Waste Handling Issues", for orders directing the staff to prepare a new detailed statement on environmental considerations, directing the applicant to respond to certain related specific interrogatories, and permitting NRDC to introduce evidence by direct testimony and cross-examination of witnesses. The motion was supported by the intervenor New England Coalition on Nuclear Pollution.

We consider at the outset the request that the Appeal Board certify to the Commission the substantive questions which are now in issue.

Under paragraph 2.785(a)(1) of its Rules of Practice, 10 CFR Part 2, the Commission has delegated to the Appeal Board the authority and the review function which would otherwise be exercised and performed by the Commission itself. See 36 Fed. Reg. 3837, 3838, February 27, 1971. Having been given the responsibility of relieving the Commission of this burden, it is our obligation to carry it out, subject to the Commission's review, unless we conclude that we are incapable of doing so without prejudice to the Commission's performance of its duties. See *1969 Annual Report, Administrative Conference of the United States,* pp. 17, 38-39. If the Commission in its wisdom should conclude that it should review on its own motion a decision or action of this Appeal Board, it will doubtless exercise its reserved power to do so. 10 CFR Section 2.786.

The motion of NRDC and the related rulings of the Licensing Board raise the question of the scope of Appendix D of Part 50 of the Commission's regulations. Appendix D is patterned upon the language of Section 102 of the National Environmental Policy Act of 1969, P.L. 91-190, 43 U.S.C. 4321 *et seq.* The Commission initially published Appendix D as an interim statement of general principles and procedures under that Act (35 Fed. Reg. 18469, December 4, 1970; see also 35 Fed. Reg. 5463, April 2, 1970). After the decision of the United States Court of Appeals for the District of Columbia Circuit in *Calvert Cliffs' Coordinating Committee* v. *Atomic Energy Commission,* 449 F.2d 1109 (July 23, 1971), it published a revised Appendix D (36 Fed. Reg. 18071, September 9, 1971).

The issues presented by the NRDC motion and the referred rulings, as they now lie before this Appeal Board,

appear to be whether the Licensing Board is to consider the environmental hazards of transporting and reprocessing spent fuel from the facility, transporting and disposing of the high level wastes issuing from reprocessing, transportation and storage of low level wastes, and ultimate disposal of the contaminated structures of the facility itself at the end of its useful life; and whether the detailed environmental impact statement prepared by the staff must address each of these issues.

We have concluded that the Licensing Board should consider the transportation of spent fuel to a reprocessing plant, and the transportation from the nuclear power plant of high level wastes as well as of low level wastes, but should not consider in this proceeding operations of a reprocessing plant or the disposal of wastes resulting from reprocessing. We have also concluded that the environmental effects to be addressed by the staff should extend to and be limited to the same scope.

During the course of the proceeding NRDC has served voluminous interrogatories on various subjects, including radioactive wastes and their disposal. The applicant has answered almost all of them, but has declined to answer two concerning reprocessing and the disposal of wastes from a reprocessing plant. The staff's draft detailed statement on environmental considerations, which has been filed since the Licensing Board's referral to us, has taken into account the handling of radioactive wastes at the plant and the transportation of irradiated nuclear material and solid radioactive waste from the plant.

Section A of Appendix D, 10 CFR Part 50, which prescribes the scope of the subject matter of the environmental study to be conducted in implementation of paragraph 102(2)(C) of the National Environmental Policy Act, de-

fines that subject matter in the same language as paragraph 102(2)(C), 42 U.S.C. 4332(2)(C):

> "(i) the environmental impact of the proposed action,
> (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
> (iii) alternatives to the proposed action,
> (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
> (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented."

The applicant has included in its environmental study the transportation of irradiated fuel from the reactor to a fuel reprocessing plant, as well as the transportation of packaged radioactive material from the reactor to burial grounds for low level wastes. It has done so pursuant to a memorandum of September 1, 1971, distributed by the Director of Regulation by means of a circular letter of September 3, 1971. The memorandum of September 1 was not a regulation adopted and published in accordance with Section 4 of the Administrative Procedure Act, 5 U.S.C. 553. It was a guide (see 36 Fed. Reg. 22851, n. 1, (1971) which did not establish a definitive regulatory requirement, but merely represented a solution considered acceptable as complying with requirements otherwise imposed.[3]

We conclude that the exclusion of the reprocessing function and its resulting wastes from the environmental study

[3] If a statement of policy is intended to have binding effect, it is a "rule" (Sec. 2(c). Administrative Procedure Act, 5 U.S.C. 551(4)) which becomes effective when adopted pursuant to the procedures of Section 4, *National Labor Relations Board* v. *Wyman-Gordon Co.*, 394 U.S. 759, 763–765 (1969); *Texaco, Inc.* v. *Federal Power Commission*, 412 F.2d 740 (3d Cir. 1969); *National Motor Freight Traffic Association* v. *United States*, 268 F. Supp. 90 (D.C. 1967), aff d 393 U.S. 18 (1968); *Seaboard World Airlines, Inc.* v. *Gronouski*, 230 F. Supp. 44 (D.C. 1944); *Devcon Corp.*, 70 F.T.C. 1780, 20 Ad. L. 2d 292 (1966).

required by paragraph 102(2)(C) and by Appendix D of Part 50 is consistent with the purposes of the Environmental Policy Act and Appendix D and is proper.

Congress has directed in the Environmental Policy Act that an agency follow certain procedures in its decision making, and take into account the specified environmental factors; but it has not prescribed that any particular result shall follow when those factors have been taken into account.[4]

Whether the Environmental Policy Act and Appendix D of Part 50 should be so construed that the environmental study to be accomplished in this individual reactor licensing proceeding is to be extended to the reprocessing of fuel elements in a reprocessing plant and the disposition of waste resulting from that process requires examination of the relation of this reactor to the reprocessing function against the background of the nature, size and structure of the nuclear industry. We may take official notice of these general circumstances as descriptive of the nuclear industry at large.[5]

There are well over 100 commercial central station nuclear plants which are operable, under construction, or on order; more than 20 of these are already operating under license, about 40 have been granted construction permits and are in the course of operating license proceedings, about 15 more have been granted construction permits, and ap-

[4] *Calvert Cliffs' Coordinating Committee* v. *Atomic Energy Commission*, 449 F.2d 1109, 1112, 1115 (D.C. Cir. 1971); *Committee for Nuclear Responsibility* v. *Seaborg*, 463 F.2d 783 (1971), 3 E.R.C. 1126 (D.C. Cir. Oct. 5, 1971); *Upper Pecos Association* v. *Stans*, 452 F.2d 1233 (10th Cir. 1971).

[5] 10 C.F.R. Sec. 2.743(i); *Attorney General's Manual on the Administrative Procedure Act*, 79–80; *Davis, Administrative Law Treatise*, Vol. 2 and 1970 Supp., Secs. 15.03–15.06.

proximately another 40 are in construction permit proceedings. *Nuclear Industry 1971,* U.S. Atomic Energy Commission, 81. In addition to chemical reprocessing facilities operated by the Commission, three commercial reprocessing plants are in operation or under construction, and at least one other may be built in the near future. *Id.*, 133-136.

The record indicates that none of the nuclear fuel in the Vermont Yankee reactor will be replaced or reprocessed until 18 months after the commencement of operation, when about 4 percent of the fuel assemblies will be replaced. It is expected that about 40 percent of the fuel assemblies will be replaced 12 months later, and that 25 to 30 percent will be replaced each 12 months thereafter. As assemblies are removed from the reactor they will be stored in a storage pool at the site for 3 or 4 months at least, until they are shipped to a reprocessing plant. The spent fuel will be transported, under contracts to be let by Vermont Yankee, in heavily shielded casks by truck or rail, under applicable regulations of the Atomic Energy Commission (see e.g., 10 CFR Parts 70, 71, 73) and of the Department of Transportation (49 CFR Parts 172, 173).

Aside from the spent fuel, the wastes which will be generated at the plant will consist largely of slightly contaminated water treatment resins and such miscellaneous slightly contaminated items as rags, floor sweepings, worn-out equipment and paper. A small portion of the resins, amounting to about 65 cubic feet per year, will be slightly higher in activity and will be transported in appropriately designed and shielded casks, probably by tractor-trailer.

We recognize that there will be an incremental environmental effect ultimately resulting from the operation of this reactor as the result of the operation of whatever reprocessing plants and disposal grounds may from time to time be used during the life of the plant. There is no way

of ascertaining now which of the various reprocessing plants now in existence or to be constructed will from time to time receive some irradiated fuel elements from this plant for reprocessing during its estimated 40-year life. Reprocessing plants do not all use the same method of chemical separation of fissionable materials from the wastes, and there is no reason to believe that during the useful life of the Vermont Yankee plant other methods will not be developed for that purpose.

Each reprocessing plant which has been and will be constructed is a "production facility" within the meaning of Paragraph 50.2(a)(3) of the Commission's regulations (10 CFR Part 50). In the interest of the protection of the public health and safety and the national security, each has been or will be subjected to full review under 10 CFR Part 50 and other pertinent regulations through the procedures established in 10 CFR Part 2 for such a facility. Each plant not yet licensed will be subjected to full environmental review as a part of the Commission's licensing action under Paragraph 102(2)(C) of the Environmental Policy Act (10 CFR Part 50, App. D, par. A.1) — the procedure which NRDC now seeks, in effect, to invoke in this licensing proceeding for those same facilities *en masse*. The procedures are already in course for two reprocessing plants which are under construction or awaiting operation.[8]

The scope of the inquiry required by Paragraph 102(2)(C) is repeatedly defined by the language of that section and as reflected in the language of Appendix D, as the impact, the consequences and the alternatives of "the proposed action", which in the present case is the licensing of a specific nuclear power reactor. The language of Section 102 directs that the environmental statement shall be

[8] *Matter of General Electric Company* (Docket No. 50-268); *Matter of Allied Gulf Nuclear Systems, Inc.* (Docket No. 50-332).

accomplished "to the fullest extent possible". But "the proposed action" is the licensing of the Vermont Yankee reactor and not of other present and future facilities at other places, to be operated by other firms, and having at best a contingent and presently indefinable relation to this facility. Paragraphs A.3, A.4, and A.8 of Appendix D repeatedly refer to the environmental impact of "the facility" as defining the scope of the analysis. Paragraph A.10 refers to "the proposed licensing action", meaning the licensing of the particular facility which is before the Licensing Board and before us in a specific proceeding.

It is evident to us that evaluation of the environmental effects of the operation of one or more unidentifiable reprocessing plants, employing separation processes which are unidentified and which may or may not now be known or used, during the course of the forty-year life of the plant, is not possible at this time and in this proceeding. If the fuel elements of the Vermont Yankee plant pass through the process stream of one reprocessing plant or another now operating or to operate in the future, preceded and followed by the fuel elements and their constituents from other plants, we cannot see how any effect of that process on the environment, taking into account the factors enumerated in Subsection 101(b) and Section 102 of the Environmental Policy Act, 42 U.S.C. Subsection 4331(b), 4332, can be analyzed except as a part of the integrated analysis of the total operation of that specific reprocessing plant. This analysis will be conducted for each reprocessing plant to be built in connection with the licensing of that plant as a "facility". Any reprocessing plant now in existence, if not already required to be subject to environmental review (see 10 CFR Part 50, App. D, Section B, Section C, and paragraphs A.1, A.8, and A.14) will be subject to review before any modification is permitted which, in the language

of Paragraph 102(2)(C), is one "significantly affecting the quality of the human environment."

No one has indicated, and we are unable to perceive, any significant respect in which the Vermont Yankee plant will have any different relation from any other nuclear power station to the reprocessing part of the fuel cycle. The logical consequence of the position of NRDC is that in every reactor licensing proceeding it would be required by Paragraph 102(2)(C) that there be an environmental analysis of the operation of every reprocessing plant, present and future, to which its nuclear fuel might be sent for reprocessing. We cannot believe that this was the intent of Congress in directing that there be an environmental analysis in each case of "the proposed action".

In specifying the scope of the environmental analysis prescribed by Paragraph 102(2)(C) as applicable to nuclear facilities, Appendix D has reflected the guidance of the Council on Environmental Quality,[7] which has been designated by Congress in Subsection 102(B) and Title II of the Environmental Policy Act, 42 U.S.C. 4342, as the consultant to insure appropriate consideration of environmental amenities and values.

The conclusion we reach is consistent with the "Guidelines of the Council on Environmental Quality for Statements on Proposed Federal Actions Affecting the Environment" (36 Fed. Reg. 7724, 1971). Although the "actions" subject to the Guidelines "are not limited to" those enumerated explicitly in Paragraph 5, it is evident on reading the Guidelines as a whole that each environmental impact statement should be about a specific "project . . . involving a Federal . . . license" (e.g. par. 5(a)(ii), 5(b)) or a specific

[7] See 35 Fed. Reg. 18469, December 4, 1970; 36 Fed. Reg. 18071, September 9, 1971.

"action" (par. 6(a)(i)(iii)(iv)). The Guidelines do not contemplate that the comprehensive environmental review of every "project" or "action" is required to include other "projects" or "actions". They thus speak of the effect of the proposed change upon "the area in question". (Par. 6(a)(ii); *cf.* pars. 9, 10). The "project . . . involving a Federal . . . license" (par. 5(a)(ii)) which we have before us is the operation of the Vermont Yankee reactor.

We are not concerned here with a situation in which a single "project" or "action" by the agency is being fragmented (*Named Individual Members of San Antonio Conservation Society* v. *Texas Highway Department*, 446 F.2d 1013 (5th Cir. 1971)), but one in which we are simply called upon to ascertain the scope of the environmental review to be conducted in this proceeding by defining the "action" in which the agency is engaged.

The staff's voluminous draft detailed impact statement on the environmental considerations relating to the proposed issuance of the Vermont Yankee operating license, which has been filed under the Guidelines of the Council on Environmental Quality and the Commission's Appendix D, will be referred for comment to other Federal agencies and State and local officials. The draft detailed statement includes, among other things, consideration of the radioactive wastes to be produced, the waste treatment and waste handling systems, and the transportation of and disposition of solid radioactive wastes. It also considers the ultimate decommissioning and decontamination of the plant. The inclusion of these subjects in the staff's draft statement, with such further evidence as may be admitted and the Licensing Board's findings and conclusions under Appendix D, will dispose of so much of the motion of NRDC as relates to them.

It should not be assumed that the environmental effects of the handling and disposition of wastes are being neglected. The Commission has issued a guide for the submission of information for the evaluation of the environmental effects of facilities (37 Fed. Reg. 10013, 1972), and the development of these detailed criteria is continuing. Under Section 202 of the Atomic Energy Act, 42 U.S.C. 2252, the Commission is required to keep the Joint Committee on Atomic Energy "fully and completely informed with respect to all of the Commission's activities", and the Joint Committee is required to conduct and has conducted continuing studies of the activities of the Commission. The transportation and disposition of high level wastes have repeatedly been the subject of testimony before the Joint Committee, and have at times been the subject of extended hearings.[8]

The adoption of NRDC's position could as a practical matter call a halt to the licensing of individual reactors. No power reactor could be licensed until every present and future reprocessing plant was studied in some depth — a process that would in turn, we presume, be asserted to involve every present and future power reactor in order to determine just what wastes would pass through each reprocessing plant. The operation of a reprocessing plant and the disposition of its wastes can and should be evaluated in the licensing proceeding for each reprocessing plant. "Each action" and "each project" and its environmental effects will thus be considered in depth in the appropriate proceeding which will best disclose the elements to be

[8] See *e.g.*, Hearings, Industrial Radioactive Waste Disposal, January 28–30, 1959, February 2–3, 1959, July 29, 1959; Hearings Environmental Effects of Producing Electric Power, October 28–31, 1969, November 4–7, 1969, January 27–30, 1970, February 24–26, 1970; see also Selected Materials on Environmental Effects of Producing Electric Power, Joint Committee on Atomic Energy, 91st Cong., 1st Sess., August 1969.

weighed. Each such proceeding will provide "a useful point at which public pressure can be placed". F. S. Cohen, *Field Theory and Judicial Logic,* 59 Yale L.J. 238, 251-2 (1959). For a particular nuclear reactor, analysis will thus be in its own individual proceeding, such as this one; for a particular reprocessing plant, analysis will be conducted in its own licensing proceeding with consideration of all the circumstances on the basis of which its particular environmental effects can be intelligently considered: its location, surroundings, design, processing method, capacity, and similar individual characteristics. Only in this way can the purposes of the Environmental Policy Act be sensibly and effectively served.[9]

Our careful study of the opinion of the Court of Appeals for the District of Columbia Circuit in *Calvert Cliffs' Coordinating Committee, Inc.* v. *Atomic Energy Commission,* 449 F.2d 1109 (1971), does not lead us to any different conclusion. Notwithstanding strong language in that case on

[9] The Administrative Conference of the United States has recommended reasonable limitation of alternatives to be considered in licensing procedures (Recommendation No. 15. Consideration of Alternatives in Licensing Procedures, 1969 Annual Report, Administrative Conference of the United States (1970), 45:

"Court decisions, notably *Scenic Hudson Preservation Conference* v. *FPC,* [354 F.2d 608 (2d Cir. 1965), *cert. denied,* 384 U.S. 941 (1966)] have emphasized that in licensing cases the Federal Power Commission must explore and give proper consideration to possible alternatives to the specific plan proposed by the applicant. This principle may in the future be applied to other licensing agencies. Since the range of possible alternatives in any case can be extensive and in some cases virtually unbounded, ways must be sought to control the scope and duration of licensing proceedings within manageable limits while meeting the requirements of the law.

"RECOMMENDATION

"Each agency which issues licenses . . . should seek to create procedures fitting its particular circumstances which will assure appropriate consideration of alternatives where necessary, and at the same time will permit effective administration of that agency's licensing functions."

the issues there presented, the Court's observations are addressed to the environmental study of "the proposal" or "the proposed action", in the language of the Environmental Policy Act, and to "a particular project" (449 F.2d at 1114, 1123).

In *Natural Resources Defense Council, Inc.* v. *Morton,* 458 F.2d 827, 3 E.R.C. 1558 at 1563, 1564 (January 13, 1972), the same Court has more recently pointed out that the required discussion of environmental effects need not be exhaustive, but is required only to extend to reasonable lengths:

"The statute must be construed in the light of reason if it is not to demand what is, fairly speaking, not meaningfully possible . . .".

• • •

"So long as the officials and agencies have taken the 'hard look' at environmental consequences mandated by Congress, the court does not seek to impose unreasonable extremes or to interject itself within the area of discretion of the executive as to the choice of the action to be taken."[10]

That the Court was unanimous in the views we have quoted is evidenced in the separate opinion of Judge MacKinnon (458 F.2d 827 at 839, 3 E.R.C. at 1565-1570).

Our conclusion is reinforced by *Scientists' Institute for Public Information, Inc.* v. *Atomic Energy Commission,* Order of Court (D.C. March 24, 1972), in which the Court rejected the claim that, in connection with the construction of a proposed experimental fast breeder reactor, the environmental review must extend beyond the specific reactor to the environmental effects of such reactors at large.

NRDC has asserted that it has no forum other than this proceeding in which the broad environmental studies it

[10] Citing the *Calvert Cliffs'* case.

seeks may be pursued. That is not the case. Each reprocessing plant has been and will be subject to the licensing procedures and standards established by the Commission's regulations, and in each such present and future proceeding a comprehensive analysis is being or will be made of its environmental effect. The Commission has procedures for rulemaking (10 CFR Part 2, Subpart H), under which the intervenors may by petition initiate rulemaking for the establishment of such regulations as they may choose to put forward. If in the judgment of the Commission it should be appropriate to resolve any specific questions which affect the industry as a whole, within the broad policy concerns which NRDC presents, then the rulemaking procedure is available.

Bearing in mind the purposes of the Environmental Protection Act, the Licensing Board will consider the extent to which the low level wastes, and the 65 cubic feet per year of resins which have a somewhat higher level of activity, will have an effect "significantly affecting the quality of the human environment" (National Environmental Policy Act of 1969, Sec. 102(2)(C), 42 U.S.C. 4332). In the exercise of the Licensing Board's discretion as to the extent to which evidence will be admitted or interrogatories allowed with reference to such subjects, it would be especially appropriate to limit inquiry to a level of detail appropriate to the character of the potential hazard associated with these wastes, so long as the Board has in its judgment an adequate basis for the required findings and conclusions (10 CFR Subsection 2.743(c)).

Evaluation of the environmental aspects of the ultimate depository of the high level wastes resulting from reprocessing is at this time speculative, because it has not yet been determined what the nature or the location of the ultimate depository will be. That project will also of course be subject to independent analysis and procedures in compliance with the Environmental Protection Act, and it cannot be the subject of appropriate evaluation in this proceeding.

The transportation of low level wastes to burial grounds was included within the scope of environmental review specified in the memorandum of the Director of Regulation dated September 1, 1971, and issued on September 3, 1971. Although that document does not have the effect of a binding regulation, we adopt it to that extent for the purposes of this proceeding. Since the operation of such burial grounds is licensed under other provisions of the Commission's regulations (10 CFR Part 30), the environmental aspects of each facility of that character may be considered in other proceedings.

The motion of NRDC included the request that the environmental study extend to the ultimate decommissioning and decontamination of the facility at the end of its useful life of about 40 years. The decommissioning and decontamination of power reactors have already been conducted within the framework of our licensing procedures, furnishing a practical basis for analysis.[11] The applicant has not opposed the inclusion of decommissioning and decontamination in the environmental study, the staff has considered it in its draft impact statement, and it may be considered in the Licensing Board's Findings and conclusions.

During the course of the hearing the Licensing Board raised the question that compliance with the objectives of the Environmental Policy Act does not explicitly fall within

---

[11] *Matter of General Electric Company*, Docket No. 50-18; *Matter of Puerto Rico Water Resources Authority*, Docket No. 115-4; *Matter of City of Piqua, Ohio*, Docket No. 115-2.

the issues committed to the Licensing Board by the notice of hearing issued in this proceeding. This notice of hearing was superseded on March 1, 1972, with respect to environmental considerations by a supplemental notice of hearing which accomplished that purpose (37 Fed. Reg. 4733, (1972)).

Paragraph A(11) of Appendix D describes the functions to be performed by the Licensing Board with regard to the environmental statement and directs that its initial decision include findings and conclusions which may affirm or modify the contents of the final detailed statement prepared by the staff. The Licensing Board's findings and conclusions should of course be based upon all of the evidence before it (Administrative Procedure Act, Subsection 7(c), 5 U.S.C. 556(d)), and the evidence on which they will be based will very largely be in the record already. The extent to which further evidence may be required or appropriate is for the Board to determine in its discretion. The Board should allow such additional evidence as in its judgment is requisite to satisfy the purposes of the Environmental Policy Act and to support the findings and conclusions required by Appendix D, permitting only such additional evidence to be admitted as is in its judgment relevant, material, and reliable and not unduly repetitious (10 CFR Subsection 2.743(c)). The weight to be given to various environmental considerations is of course for the Board to consider.

It is therefore ORDERED:

1. So much of the motion of NRDC as requests that the substantive questions involved in the referral by the Atomic Safety and Licensing Board dated December 29, 1971, be referred to the Commission is denied;

2. Evidence as to the environmental effects of the transportation of irradiated nuclear fuel from the Vermont Yankee nuclear power plant to a reprocessing plant or other destination shall be admitted;

3. Evidence as to the environmental effects of the reprocessing of irradiated nuclear fuel, and the disposal of wastes resulting from reprocessing, shall not be admitted;

4. Evidence as to the environmental effects of the transportation of low level wastes, and of high level solid wastes other than irradiated fuel, from the reactor to depositories shall be admitted;

5. Evidence as to the environmental effects of the disposal of low and high level solid wastes shall not be admitted;

6. Evidence as to the environmental effects of decommissioning and decontamination of the facility at the end of its useful life shall be admitted;

7. The scope of the final environmental statement to be prepared by the staff, and of the findings and conclusions of the Licensing Board pursuant to 10 CFR 50, Appendix D, shall be consistent with the foregoing.

BY THE ATOMIC SAFETY AND LICENSING APPEAL BOARD,

WILLIAM L. WOODARD, *Executive Secretary.*

ALAB-179

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Michael C. Farrar, Chairman
Dr. John H. Buck, Member
Dr. Lawrence R. Quarles, Member

In the Matter of

VERMONT YANKEE NUCLEAR POWER CORPORATION — Docket No. 50-271

(Vermont Yankee Nuclear Power Station)

Mr. Anthony Z. Roisman and Ms. Karin P. Sheldon, Washington, D.C., for the intervenor New England Coalition on Nuclear Pollution.

Messrs. Richard Ayres and David Schoenbrod, New York, N. Y., for the intervenor Natural Resources Defense Council, Inc.

Mr. Thomas G. Dignan, Jr., Boston, Mass. (with whom Messrs. Allen O. Eaton and John A. Ritsher, Boston, Mass., were on the brief) for the applicant Vermont Yankee Nuclear Power Corporation.

Mr. Donald W. Stever, Jr., Assistant Attorney General, Concord, New Hampshire, for the State of New Hampshire.

Mr. Gregor I. McGregor, Assistant Attorney General, Boston, Mass., for the Commonwealth of Massachusetts.

Messrs. Kimberly B. Cheney, Attorney General, and John R. Ponsetto, Assistant Attorney General, Montpelier, Vermont, filed papers for the State of Vermont.

Mr. William Massar (with whom Mr. Mark R. Haflich was on the brief) for the AEC Regulatory Staff.

DECISION

February 28, 1974

We have before us for review the initial decision of the Licensing Board authorizing the issuance of a full-term, full-power operating license for the applicant's Vermont Yankee Nuclear Power Station, a boiling water reactor facility located on the Connecticut River near Vernon, Vermont.[1] Exceptions to that decision were filed by the New England Coalition on Nuclear Pollution (NECNP) and the Natural Resources Defense Council (NRDC), two intervenors in the proceeding.[2]

After hearing oral argument on the exceptions and on certain matters which we raised *sua sponte*,[3] we determined that prompt action on our part was necessary with respect to two safety-related matters. For that reason, we issued an opinion dealing only with those two subjects. ALAB-124, RAI-73-5 358 (May 23, 1973). By that decision, we remanded the proceeding to the Licensing Board for further consideration of (1) NECNP's motion to reopen the record (2) and the adequacy of the applicant's quality assurance program.

Because our action created a real possibility that the hearing record would be reopened on a number of subjects and that the initial decision would be altered, we deferred review of the initial decision and the remaining exceptions pending the outcome of the remand (*id.* at 359). We need

---

[1] LBP-73-8, RAI-73-2 130. The applicant had previously been granted a temporary operating license for the facility, under the then-existing authority conferred by § 192 of the Atomic Energy Act, 42 U.S.C. 2242.

[2] The other principal parties — the applicant, the AEC regulatory staff and three New England States — filed no exceptions.

[3] See ALAB-120, RAI-73-4 268 (April 26, 1973).

not recount here the events which transpired after the initial remand. Those events are reflected in the numerous opinions which we have issued in the interim.[4] For present purposes, it is sufficient to state that the hearing was reopened for consideration of the fuel densification issue, the plant was derated pending the outcome of that reopened hearing, and only recently was the fuel densification problem finally resolved, allowing once again for normal operations.

The matters which were the subject of remand now having been resolved, we complete our review of the initial decision in this opinion. By way of introduction, we can point out that NRDC's twenty-seven exceptions focus primarily upon the adequacy of the cost-benefit analysis mandated by the National Environmental Policy Act, while NECNP's sixteen exceptions cover a variety of topics.[5] Some of the principal issues raised have been largely disposed of by decisions we rendered either at earlier stages of this proceed-

[4] After the initial remand, we issued the following published opinions: ALAB-126, RAI-73-6 393 (June 7, 1973); ALAB-131, RAI-73-6 427 (June 25, 1973); ALAB-138, RAI-73-7 520 (July 25, 1973); ALAB-141, RAI-73-8 576 (August 22, 1973); ALAB-167, RAI-73-12 1151 (December 20, 1973).

[5] While we wish to commend all parties on the quality of the briefs filed, we were particularly impressed with the manner in which NECNP presented its exceptions and supporting brief. Although governed by the former version of the rules (see 10 CFR (1973 ed.) 2.762), those filings achieved in full measure the goals of clarity and precision which the present version of the rules is designed to accomplish (10 CFR 2.762, as amended March 2, 1973, 38 *F.R.* 5624). The exceptions avoided the unnecessary multiplicity which has been a problem in certain recent cases. Moreover, it materially aided our consideration of the exceptions and our understanding of the parties' positions to have the exceptions related to a common topic grouped for briefing, with the text of the exceptions repeated at the beginning of the relevant portion of the brief (*cf. Long Island Lighting Co.* (Shoreham Station), ALAB-156, RAI-73-10 831, 832 (October 26, 1973). The assistance provided by all of the briefs was especially important in light of the complete absence of record references in the initial decision.

ing[6] or in other cases. Accordingly, we give those issues summary treatment in the initial portion of this opinion, and cover the other issues in more depth in the remaining portions.

I

ISSUES COVERED BY PRIOR DECISIONS

The issues which have been largely resolved by our prior decisions include the adequacy of the emergency core cooling system (ECCS) interim acceptance criteria (IAC); the adequacy of the treatment in this proceeding of "Class 9" accidents; the environmental impact of the fuel cycle; and the environmental impact of the uses to which the electricity produced in this facility will be put.

A. *ECCS.* NECNP asserts that it should not have been precluded from presenting evidence on the question as to whether the ECCS interim acceptance criteria, "if met,"[7] would "provide sufficient protection for the public health and safety." This issue had its genesis in NECNP's attempt to challenge the validity of the criteria on the dual grounds that their adoption was procedurally defective and that they were substantively unsupported. In response to a set of questions certified to us during the course of the hearing below, we held that the procedural objections were not well founded and that, in view of the pendency of a rulemaking proceeding at which the merits of the criteria were

[6] Prior to the issuance of the Initial Decision on the full-power, full-term operating license, this Board issued a number of decisions in response either to questions certified by the Licensing Board or to decisions on less than full power or less than full term operating licenses.

[7] The question as to whether the facility met the criteria was explored at the hearing, and NECNP eventually conceded (see App. Bd. Tr. 40) that the criteria were met (absent the subsequently revealed effect of the fuel densification phenomenon).

under consideration,[8] it would be inappropriate to consider the substantive objections in an individual licensing proceeding. ALAB-57, WASH-1218 435 (June 20, 1972); see also *Consolidated Edison Co.* (Indian Point 2), ALAB-46, WASH-1218 293 (March 10, 1972).

We see no reason to reexamine these holdings. Specifically, we find unavailing NECNP's assertion that ALAB-57 ignored the then-existing "Calvert Cliffs" principle. That principle permitted limited attacks upon the substantive validity of Commission regulations in individual licensing proceedings and established a method for presenting such an attack.[9] In announcing the "Calvert Cliffs" principle, however, the Commission did not have before it a situation in which there was pending — as there is here — a rulemaking proceeding concerned with the precise regulation under attack. And nothing in that decision indicates that the principle there established should be invoked if rulemaking were pending. The reasons expressed in ALAB-57 are sufficient to explain why it was appropriate not to invoke the "Calvert Cliffs" rule in this instance.

While we are thus rejecting NECNP's ECCS exceptions (numbers 1 and 2) on their merits, the applicant insists that those exceptions are procedurally defective as well, in that they involve matters not raised or preserved below. The applicant asserts that a comparison of the exceptions with the wording of one of NECNP's proposed conclusions of law

---

[8] That rulemaking proceeding was recently concluded by the Commission's issuance of a lengthy decision announcing the adoption of acceptance criteria for emergency core cooling systems. CLI-73-39, RAI-73-12 1085 (December 28, 1973).

[9] The "Calvert Cliffs" principle was first articulated in the Commission's memorandum decision of August 8, 1969 in *Baltimore Gas and Electric Co.* (Calvert Cliffs Units 1 and 2), — AEC —. That principle has since been substantially modified by 10 C.F.R. 2.758.

demonstrates that the exception has a different thrust than the matters raised before the Licensing Board.

We agree with the applicant that NECNP never properly presented a claim that this facility was somehow different from other plants and for that reason the application of the IAC to it would not adequately protect the public health and safety. NECNP's claims were only that the criteria themselves were generally invalid (see NECNP Motion of March 6, 1972, and Statement of March 7, 1972). By the same token, however, we cannot accept the applicant's further insistence that NECNP has waived *all* ECCS contentions. As just indicated, NECNP quite clearly attempted to challenge the validity of the IAC. This Board unequivocally rejected its challenge at an interlocutory stage of the proceeding. Once that occurred, NECNP was under no obligation to file proposed findings of fact and conclusions of law on the subject of its challenge to the criteria — no further steps had to be taken to preserve its exception to the ruling rejecting its challenge to the validity of the criteria. *Cf. Consumers Power Co.* (Midland Units 1 and 2), ALAB-123, RAI-73-5 331, 333-34 (May 18, 1973).

B. *"Class 9" Accidents.* NECNP's exceptions 6, 7 and 8 are all based on its contentions below that, for reasons related to asserted ECCS ineffectiveness, the assumptions underlying the analysis of the environmental impact of a "Class 9" accident were improper). We recently had occasion to discuss a similar "Class 9" accident argument in some detail. *Long Island Lighting Co.* (Shoreham Station), ALAB-156, RAI-73-10 831 (October 26, 1973). There, after fully defining the term "Class 9" (*id.* at 834-835), we explained that the guidelines for treatment of such accidents in individual licensing proceedings did not, in general, "close the door to consideration of Class 9 accidents" (*id.* at 835). Rather, we explained, the parties would be permitted to

demonstrate the appropriateness of assumptions other than that utilized by the staff in the first instance, *i.e.*, that the particular accident under consideration had such a low probability that the environment risk is insignificant (*ibid.*).

Again, however, this general rule cannot be relied upon to legitimize an attempt to demonstrate a likelihood that the ECCS will not work. For, once it has been established that the facility complies with the applicable ECCS criteria, entertaining such an attempt would be the equivalent of entertaining a challenge to the ECCS criteria themselves. As we have already indicated, all such challenges were required to be deferred for consideration in the rulemaking proceeding. ALAB-57, *supra*, p. 161-162; see also ALAB-156, *supra*, RAI-73-10 at 847.

C. *Fuel Cycle.* By virtue of a ruling of this Board, both NECNP and NRDC were precluded from adducing evidence concerning the environmental impact of the fuel cycle. ALAB-56, WASH-1218 395 (June 6, 1972).[10] We decline the invitation, presented by their exceptions, to reexamine the validity of the reasons assigned in ALAB-56 in support of our refusal to permit inquiry into the effect of most aspects of the fuel cycle. For, regardless of the correctness of those reasons, we would, for another reason, have to reach the same result if faced anew with the question.

Specifically, shortly after the issuance of ALAB-56, the Commission initiated a rulemaking proceeding to consider the extent of the environmental impact of the fuel cycle and to ascertain how to weigh that impact in an individual licensing proceeding. See the November 15, 1972 Notice of Proposed Rulemaking on the Environmental Effects of the

[10] See also *Consumers Power Co.* (Midland Units 1 and 2), ALAB-60, WASH-1218 (Suppl. 1) 459 (July 19, 1972).

Uranium Fuel Cycle (37 *F.R.* 24191). Whatever doubt there may have been concerning the correctness of the result reached in ALAB-56 has been eliminated by the convening of that rulemaking proceeding. Once that proceeding was initiated, it would have been singularly inappropriate to undertake to duplicate it in an individual reactor licensing proceeding. See ALAB-57, *supra*, WASH-1218 at 443-44.[11] Thus, even in the absence of the Commission's express directive that we adhere to ALAB-56 pending the outcome of the fuel cycle rulemaking (37 *F.R.* at 24193), we undoubtedly would have done so. For this reason, and for the reasons expressed in the two *Shoreham* opinions (ALAB-99, RAI-73-2 53 and ALAB-156, *supra*, RAI-73-10 at 833), the fuel cycle exceptions (NECNP number 3 and NRDC numbers 6(i), 20, 24 and 25) are denied.[12]

D. *Consequences of the Use of Electricity.* In *Shoreham*, we also held that the consequences of the use of electricity produced at a nuclear facility should not be considered in an individual licensing proceeding. The reasons for that holding were articulated in some detail and are dispositive of NECNP's exception 4 filed here. ALAB-156, *supra*, RAI-73-10 at 852-54. See also *Nucleus of Chicago Homeowners v. Lynn*, — F. Supp. — , 6 E.R.C. 1094 (N.D. Ill., Nov. 21, 1973).

[11] The rulemaking proceeding is also a far more appropriate forum for the consideration of the environmental impact of the fuel cycle than is a proceeding concerned with the licensing of a particular reprocessing plant or waste disposal facility (*Cf.* ALAB-56, WASH-1218 at 404-06).

[12] NRDC's exception 27 touches on an aspect of the fuel cycle — i.e., transportation of spent fuel from the reactor to a reprocessing facility — concerning which inquiry may be made in an individual licensing proceeding. See ALAB-99, *supra*, RAI-73-2 at 54. Nothing in the unparticularized argument in support of that exception (Brief, p. 33), however, points to any "alternatives to 'normal' transportation procedures" which could "reduce the environmental risks" (*ibid.*). The exception is denied.

II

LOW-LEVEL RADIOACTIVE EMISSIONS

A. Two of NECNP's exceptions (numbers 9 and 10) concern the question of whether plant operations can be expected to comply with the requirement, embodied in 10 CFR 20.1(c), that "every reasonable effort" be made to maintain radioactive releases "as far below the limits specified in [Part 20] as practicable."[13] NECNP's claim that the staff and the applicant did not perform analyses adequate to demonstrate that releases would be kept "as low as practicable" focuses on two time periods: (1) an interim period prior to the scheduled installation of an improved off-gas system, and (2) the period thereafter, extending over the remaining life of the license.

With respect to short-term operation, NECNP argues that the Licensing Board misinterpreted the applicable regulation when it concluded that a "reasonable effort" consisted of promising to investigate the higher-than-expected releases which had occurred during operations under the temporary operating license while continuing to operate the plant. Turning to long-term operation, NECNP argues that the studies necessary to determine whether, on balance, the optimum system for control of radioactive releases had been chosen have never been performed. Accordingly, it urges, the record provides no basis for a determination as to whether the "as low as practicable" criterion has been met.

[13] A supplementary requirement, covering only facilities for which applications were filed after January 1, 1971, utilizes the terminology "as low as practicable." 10 CFR 50.34a(a). Both that term and the term used in 10 CFR 20.1(c) are defined as meaning "as low as is practicably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and in relation to the utilization of atomic energy in the public interest." For convenience, and since both forms of expression have the same meaning, we use the shorter form — "as low as practicable" — in this opinion.

B. The Commission first formally adopted the "as low as practicable" requirement on December 3, 1970 (35 *F.R.* 18385). It later initiated a rulemaking proceeding to consider whether to adopt numerical standards, embodied in a proposed Appendix I to 10 CFR Part 50, which might define precisely a level of radioactive releases would be deemed to be "as low as practicable" in all cases (37 *F.R.* 11113, June 9, 1971).

In contrast to the course followed in connection with the ECCS rulemaking, the Commission did not require that there be adherence to any numerical guidelines during the pendency of the "as low as practicable" rulemaking proceeding, which is now in its final stages.[14] Thus, in the interim, it has been permissible to contend in an individual licensing proceeding not only that a proposed radwaste system will not perform as well as is claimed, but also that the level of releases which the system is claimed to achieve is not "as low as practicable" considering "the state of technology and the economics of improvement in relation to benefits . . ." (see fn. 13, *supra*). In other words, in the absence of interim numerical guidelines and until such time as Appendix I may be adopted, a contention that a proposed level of releases is not "as low as practicable" does not constitute an impermissible challenge to the regulations (compare our ECCS rulings, discussed at pp. 161-162, *supra*); instead, such a contention raises questions only of interpretation and application of the governing regulations.[15]

[14] On January 8, 1974, the rulemaking hearing board informed the Commission that the record was complete except for the filing of the participants' final statements of position. The last of those statements is due in early March, 1974.

[15] Of course, any claim that releases must be kept below "practicable" levels — *e.g.*, a claim that an available radwaste system improvement must be utilized without regard to cost or degree of additional radwaste control achieved — would constitute an impermissible challenge to the existing regulations, at least in the absence of the showing required by 10 CFR 2.758.

During this interim period, although precise numerical standards are not available, significant assistance in interpreting the "as low as practicable" standard is furnished by 10 CFR 50.36a(b). One purpose of that provision is to permit a degree of flexibility with respect to levels of releases under unusual operating conditions, but the provision also reflects the Commission's view that average annual releases "at small percentages" of Part 20 limits are achievable under normal operating conditions. While this language does not embody a precise standard and does not serve to preclude consideration in an individual licensing proceeding of a contention which focuses on the qualitative factors now reflected in the definition of "as low as practicable," it nonetheless provides an important guideline to be utilized in evaluating the merits of such a contention. More specifically, we believe it embodies a Commission view that a radwaste system which can be shown to achieve "small percentages" of Part 20 limits is *prima facie* in compliance with the regulations. And, as is customary, the presentation of a *prima facie* case shifts the burden of going forward to the adversary, *i.e.*, to those asserting that the proposed system is inadequate.[16]

Our conclusion, just stated, concerning the effect to be attributed to the "small percentages" language stems from an application of the fundamental principle of statutory construction which requires that, if at all possible, a statute be interpreted in a manner which gives effect to all its provisions. *Weinberger* v. *Hynson, Westcott & Dunning,* 412 U.S. 609, 633 (1973). Under that principle, the "small percentages" language cannot be entirely ignored. Yet, by the same token, it cannot be equated with a fixed numerical standard which would effectively supersede the qualitative standards set forth in 10 CFR 20.1(c) and 50.34a(a).

[16] See and compare *Midland,* ALAB-123, *supra,* RAI-73-5 at 345.

In sum, in order to give effect to all portions of the applicable regulations, we must regard a showing by the applicant and staff that the proposed system will achieve "small percentages" of Part 20 limits as constituting *prima facie* support for the proposition that the "as low as practicable" criterion has been satisfied. Under this view, while the ultimate burden of persuasion on the issue remains with the applicant, the burden of going forward with evidence is shifted to the opposing party. In other words, the applicant can rest on a showing that "small percentages" will be achieved; to succeed, an intervenor must then adduce its own evidence — which, of course, can include cross-examination of the other parties' witnesses — to show that even lower emissions are "practicable."[17]

C. Against this background, we can agree with NECNP that the question of compliance with the "as low as practicable" standard, pending installation of the advanced offgas system, deserved closer analysis than it received in the Initial Decision. Moreover, in light of the applicant's own statements on the last day of the hearing (Tr. 6127-52), we are perplexed by the rejection of NECNP's proposed subsidiary finding 9(a), regarding the leaking fuel rods, as "not supported by evidence in the record" (Initial Decision, p. 46, RAI-73-2 at 143).[18]

We are not now required, however, to resolve the question of short-term compliance. We have been advised that the

[17] We stress again that adoption of numerical guidelines defining what is to be regarded as "as low as practicable" — such as is contemplated by proposed Appendix I — would alter this situation.

[18] In ALAB-138, *supra,* we held that NECNP had not timely sought to reopen the hearing on the hydriding question, and that that question was not of such overriding safety importance as to excuse the untimeliness. RAI-73-7 at 526. That holding on the question of reopening was not conclusive as to NECNP's exception to the Board's resolution of the question of interim compliance, for the exception would turn on an evaluation of the evidence put in the record before the hearing closed.

advanced off-gas system has been installed. The issue is, therefore, moot.[19]

D. Turning to the question of compliance with the "as low as practicable" criterion in the long term, we note that the Board's opinion does not specifically address that contested issue. The evidence did, however, reveal that liquid releases were to be kept to 1% or less of Part 20 limits (Technical Specifications, as amended, 3.8.B.2, 3.8.F.1.b; Tr. 1865-66) and that, after the installation of the advanced off-gas system, gaseous effluents would be kept to 2% or less of those limits (Tr. 4432, 4438-39).

In our view, these values are within the range of the "small percentages" of Part 20 limits contemplated by 10 CFR 50.36a(b).[20] The applicant having thus presented a *prima facie* case, the burden then shifted to NECNP to show that even lower levels were "practicable," all factors considered. NECNP began an inquiry apparently directed to that end, and succeeded in eliciting evidence to the effect that the applicant had not examined the feasibility of certain alternatives mentioned by NECNP's counsel (Tr. 1866-99, 1938, 1950-51). While this perhaps launched NECNP's inquiry in the proper direction, those concessions do not, standing alone, suffice to rebut the applicant's *prima facie* case. In our view, to succeed NECNP had to show not only that the applicant had not investigated certain hypothetical alternatives, but also that those alternatives were indeed "practicable" ones. There is no such showing in the record, and accordingly there is no basis for a holding that the applicant's proposed system, which limits releases to small percentages of Part 20 limits, can be improved upon in a "practicable" manner.

[19] The applicant installed the advanced system during an outage which occurred while we were concerned with those issues which, because of their significant safety implications, we had singled out for rapid disposition. See fn. 4, *supra*. In this regard, we should note that NECNP did not submit to us a request for a stay of the Initial Decision pending our consideration of the propriety of operations during the period prior to installation of the advanced system.

[20] In view of the mootness of the issue of interim compliance, we need not decide whether the expected short-term off-gas releases of 10% of Part 20 limits were within the "small percentages" range.

III

COOLING TOWER OPERATION

A. The flow of condenser cooling water for this facility can be regulated so that cooling is accomplished by one of three possible methods — once-through, or open cycle, cooling, in which the total flow is discharged directly to the river; closed cycle, in which the total flow passes through the cooling towers and is recirculated; and helper cycle, in which the amount of flow through the cooling towers and the amount of water recirculated can be varied. The applicant proposed to utilize the closed system at certain times, varying its operation according to the prevailing conditions. Without downgrading the need to prevent thermal pollution of the river, the intervenors pointed out that cooling tower operation itself could be environmentally degrading through creation of excessive fog or noise.

The Board found that little, if any, environmental insult would result from the operation of the towers. With respect to the noise problem, it found that "the surveys made of the noise levels indicate that they are acceptable." Initial Decision, p. 15, RAI-73-2 at 134. The Board then determined that, at least for an extended period, all operations must be under the closed cycle mode. Its reasons for doing so were as follows (Initial Decision, pp. 27-28, RAI-73-2 at 138):

> . . . the Board concludes that there are insufficient data respecting the existing ecosystem of the Connecticut River adjacent to the nuclear plant site to permit thermal or chemical releases into the river at this time, beyond the

minimal releases resultant from closed cycle operation, that more data from a more comprehensive effort than heretofore undertaken, should be developed so that the feed stock of the river can be determined, the effects of thermal and chemical releases can be analyzed, the species and number of fish affected can be approximated, seasonal effects determined, and other relevant matters developed. The Board determines that, as a suitable alternative that will not cause significantly adverse environmental impacts, Applicant should operate with closed cycle operations at all times until these data are developed and determinations made respecting significant adverse impacts on the environment by the advisory group for non-radiological environmental monitoring, which group is established in section 2.2.2 of the Technical Specifications. The Order of the Board for closed cycle operations herein will so provide, in order to protect the ecosystem before possible injurious effects have occurred and in order to reduce fish kill and damage to zooplankton and phytoplankton. . . .

Based on this statement, the Board imposed the following as Condition A to the license (Initial Decision, p. 53, RAI-73-2 at 146):

> Applicant shall operate the nuclear power facility with closed cycle operations at all times until data are developed and determinations made respecting significant adverse impacts on the environment by the advisory group for non-radiological environmental monitoring, which group is established by section 2.2.2 of the Technical Specifications dated September 9, 1972 as further modified by Staff change dated December 27, 1972.

The applicant did not take exception to the imposition of this condition and, under our rules, thus waived any objection. 10 CFR (1973 ed.) 2.762(a). NECNP, however, filed an exception to the Board's resolution of the noise issue, asserting that "it was error to conclude that the operation of the cooling towers at Vermont Yankee would create noise levels that would always be acceptable" (Exception No. 13). We viewed this exception as presenting at least an indirect

challenge to the Board's holding that, owing to environmental considerations other than noise, all operations must be in the closed cycle mode. At the same time, we were unsure of the precise meaning of Condition A. In terms, it required closed cycle operations until "data . . . respecting significant adverse impacts on the environment" were obtained. But, we thought, complete data of that nature could not be obtained without conducting at least some once-through operation and measuring its effects. And such operation appeared to be precluded by Condition A.

For these reasons, we raised *sua sponte* and directed the parties to discuss at oral argument the following question (ALAB-120, *supra,* RAI-73-4 at 268):

> Whether the Board's requirement . . . that the plant operate with cooling towers at all times until relevant data are collected:
>
> (a) will prevent the collection of data related to the effects of once-through operation; and
>
> (b) embodies the most appropriate alternative, from an environmental standpoint, for dissipating the waste heat generated by plant operation.

The first part of that question was, of course, suggested by the procedural dilemma we thought had been created by the wording of Condition A; the second part had been suggested primarily by the probability that, if NECNP's "noise" exception were well taken, the noise problem might outweigh the other environmental considerations relied upon by the Licensing Board.

B. We have concluded that no modification of the Board's resolution of the noise issue is warranted. We have also concluded that it is appropriate to clarify Condition A to reflect unambiguously what we, and all the parties, believe to be its intent. In light of these conclusions, and in the

absence of any exception directed to the substance of Condition A, no further examination of the matter of cooling tower operation is warranted.

1. We agree with the applicant that, contrary to the view expressed in NECNP's exception, the Board did not hold that noise levels "would always be acceptable." Rather, the Board held only that the information then available indicated that the noise levels were generally acceptable, but that continuing monitoring would be conducted and that, based on the results of that monitoring, modifications might later be deemed necessary. The Board's decision in this respect is a perfectly reasonable one in light of the evidence,[21] and we have found no basis for disturbing it. In this connection, we wish only to reemphasize that the staff should give careful consideration to the results of the monitoring, so that, if necessary, steps may be taken to reduce the impact of tower noise upon nearby residents and upon the educational process at the nearby school.

2. At the oral argument, each of the parties agreed that the principal concern which led the Board to impose Condition A was the absence of adequate base-line environmental data, and that the Board's intention was that once the base-line data were obtained, consideration could be given to conducting open-cycle or helper-cycle operations. In other words, the terminology employed in Condition A was intended to result first in the acquisition of adequate base-line environmental data; then the analysis of that data by the advisory group and a prediction of whether closed-cycle operation will result in "significant adverse impact on the

[21] See the affidavit of John T. Collins (ff. Tr. 5268) and the supplementary testimony of J. E. Kruek (ff. Tr. 5297). Although in some respects the sound levels in the school building with the windows open slightly exceeded recommended levels, in Mr. Collins' opinion this would not interfere with normal classroom discussion (Affidavit, par. 8.e. and 8.g.).

environment"; followed by, if justified, the grant to the applicant of temporary authorization to depart from closed cycle operations for testing purposes and, finally, permanent authorization to conduct other than closed cycle operations under particular conditions.

On that basis, the substance of Condition A is acceptable. Consequently, as each of the parties which addressed the issue agreed was appropriate,[22] we need only amend the language of that condition to reflect more accurately its substance (see p. 186, *infra*).

3. Our resolution of any doubts concerning the noise issue and our clarification of the meaning of Condition A removes the concerns that motivated us to raise the question of the appropriateness, from an environmental standpoint, of closed cycle operation. In other words, since we agree with the Board's discussion of the noise problem and share its view that additional base-line environmental data must be gathered, there is no basis for disturbing the requirement that only closed cycle operations would be permitted until the necessary base-line data were obtained.

IV

NRDC'S CLAIMS CONCERNING THE ADEQUACY OF THE ENVIRONMENTAL IMPACT STATEMENT

A. The basic claim made by NRDC, both in the proceedings before the Licensing Board and in the exceptions filed with us, is that the environmental impact statement, and in particular its cost-benefit analysis, does not comply with "the standards set forth by NEPA and the Commission" (Brief in Support of Exceptions, p. 1). The individual ex-

[22] See App. Board Tr., pp. 57-62, 70, 75, 189.

ceptions relating to this claim arose out of the following circumstances.

1. The final environmental statement (FES) prepared by the staff and issued in July 1972,[23] was introduced into evidence at the outset of the last, and largely environmental, session of the hearing. On the last day of that session, the staff presented for cross-examination Dr. Paul C. Fine, who had participated in the preparation of the FES (Tr. 6158-59). The parties cross-examined Dr. Fine extensively; in particular, NRDC — which had had no representative present on the earlier days of the final session — conducted lengthy cross-examination (Tr. 6223-99, 6309-11).

Perhaps the principal cost-benefit contention which NRDC advanced before the Licensing Board was that the FES did not sufficiently quantify or specify in monetary terms the costs and benefits associated with facility operation. NRDC's most serious concern in this respect was the failure to place a dollar value upon the benefit received by the public from the electricity to be produced by the facility.

The Board's decision on the question of the adequacy of the cost-benefit analysis was to "accept the several costs and benefits assessed by the Staff" with certain modifications (Initial Decision at 29, RAI-73-2 at 138). The principal modification stemmed from the Board's finding that, while the staff had for the most part "quantified all items in dollars to the extent possible . . . ," it had improperly failed to do so with respect to the electricity to be produced (Initial Decision at 31, RAI-73-2 at 139). In that connection, the Board held that the monetary value of the benefit of the

[23] The applicant had submitted an environmental report in August, 1970. That report was supplemented in December, 1971. The staff's draft environmental statement was issued for comment in April, 1972. The FES contains copies of the comments submitted in response to the draft statement, as well as the staff's response to those comments.

electricity could be determined by multiplying anticipated energy production in kilowatt hours by the average retail rate of 2.18 cents per KWH (Initial Decision at 32-34, RAI-73-2 at 139-40).[24]

2. NRDC's exceptions assert that, in a number of respects, the environmental impact statement, and particularly its cost-benefit analysis, is inadequate even as modified by the Board.[25] Many of the asserted defects are said to have been present in the staff's cost-benefit analysis and not corrected, or not susceptible to correction, by the Licensing Board. In spite of its insistence that the Board place a monetary value on the benefit accruing from the electricity produced, one group of NRDC's exceptions (numbers 13, 14, 15 and 22) objects to the Board's actions in that regard as being beyond the scope of the Board's authority, lacking in evidentiary support, and arbitrary in other respects.

The question as to whether, and if so how, the value of electricity should be calculated for consideration in an environmental impact statement is a significant and recurring one. As indicated above, NRDC urged that computation of a monetary value was required, but has excepted to the Board's performance of that task. We have reviewed the Board's treatment of the issue on a plenary basis, that is, not only in light of NRDC's specific complaints but also in the exercise of our broad authority to review from all stand-

[24] The Licensing Board did not undertake to perform that calculation itself, although under its view the result of the calculation would be a significant factor in the cost-benefit analysis.

[25] Commission regulations treat initial decisions by licensing boards, and appellate decisions issued by us or by the Commission, as *pro tanto* modifications of the FES. To the extent that they deal with environmental matters, such decisions stand as modified versions of the environmental impact statement required by NEPA and are transmitted to the Council on Environmental Quality; in addition, notification of their issuance is placed in the *Federal Register*. 10 CFR Part 50, Appendix D, Section A.11.

points the correctness of all aspects of an initial decision (see ALAB-124, *supra,* RAI-73-5 at 361).

B. We have concluded that the placing of a monetary value on the benefit of electricity is not mandated either by NEPA or by Commission regulations, and that attempting such a task serves no useful purpose. If anything, the appearance of precision resulting from such an exercise tends to divert scrutiny from the difficult judgmental decisions involved in performing an accurate cost-benefit analysis and, specifically, in determining whether a genuine need for the facility exists. Accordingly, we are vacating the modification concerning the dollar value of electricity made by the Board to the cost-benefit analysis.

1. We agree in full measure with NRDC's major premise that environmental impact statements should quantify costs and benefits to the fullest extent practicable, and do so in monetary terms. While the principal focus of judicial decisions has been on the quantification of environmental costs, we have no doubt that equal attention should be paid to the quantification of the benefits sought to be achieved by a proposed project.

The question remains, however, of the extent to which a meaningful dollar value can be placed on the benefits accruing from the licensing of electric generating facilities. Quantification is, of course, practicable in describing the amount and reliability of the electricity to be produced. Assigning a dollar value to represent the resulting benefit is, however, a different matter. It may be that, for some types of projects subject to NEPA, some of the benefits can be described meaningfully in monetary terms. But the benefits achieved from the generation of electricity cannot be so described.

To be sure, the formula adopted by the Licensing Board is attractive for its simplicity. Calculating the product of two factors — KWH × average retail rate — yields an apparently precise dollar value for the "benefits" of the project in terms of electricity produced. The attractiveness of this method is, however, only superficial. Closer analysis reveals its shortcomings.

In the first place, the record provides no basis — and we are aware of none — for an assumption that the value of having electricity available is no more than the retail price which a consumer of that electricity presently pays for it. The value to society derived from being able to meet a real demand for electricity is not measurable in dollars. If the electricity to be produced by a proposed project is genuinely needed — a point which we focus on later in this opinion and which deserves close scrutiny in hearings — then the societal benefits achieved by having that electricity available are immeasurable.

In other words, given the structure of our exising society, the alternative of not meeting real demand is unthinkable. Life as we know it — indeed, the present population itself — could not be supported without electricity. In that context, and to the extent that demand is inelastic, the value of electricity cannot be measured by the amount of the bill received by the consumer — it is, in a real sense, "priceless".

In short, the dollar value which the Licensing Board would place on the benefits of electricity is, in our judgment, not an accurate, or meaningful, one.[26] Nor is it particularly

---

[26] Although, in its papers before us, the applicant appears to support the Licensing Board's approach (Brief in Opposition to Exceptions, pp. 50-53), its position before us may have been influenced by the fact that it was in the applicant's interest to defend the result reached by the Licensing Board. We find more convincing the applicant's insistence at oral argument before the Licensing Board that there exists no meaningful method

useful in attempting to construct a cost-benefit analysis. For example, the Licensing Board indicated that the average retail rate, which it utilized in calculating what it said were the "benefits", also reflected — by virtue of the nature of the rate-making process — the costs involved in producing those benefits (Initial Decision at 33-34, RAI-73-2 at 140). But NRDC, carrying this analysis to its logical — but admittedly absurd — conclusion, points out that under this approach the "benefits" of the proposed project are equivalent to the economic costs and thus economic and environmental costs together necessarily outweigh the "benefits" (Brief in Support of Exceptions, pp. 21-22). This points up the lack of meaning and utility in the Licensing Board's computation of a dollar value for benefits of electricity.

The same deficiencies can be seen from a slightly different viewpoint. The Board did note that some small portion of the retail rate — "perhaps .002 cents" — reflects profit or return on investment (Initial Decision at 34, RAI-73-2 at 140). Under this approach, "benefits" evaluated in terms of the retail rate would exceed the economic costs. But the amount of the excess of benefits over cost, supposedly a measure of the net "benefit" of the project, would in reality represent nothing other than the profitability of the utility's operation. As such, then, it is not a true measure of net "benefit", for surely there is little, if any, correlation between the profitability of the project to investors and the benefit of the project to society. Similarly, if a state elected to establish non-profit entities to produce electricity for its residents, it would not follow from the equivalency of re-

for placing a monetary value on the electricity to be produced (Oral Argument, Tr. 223-24). In that connection, we disagree with the inference drawn by the Board "that [the] Applicant contemplated that the value of electricity could be expressed . . ." in the manner the Board selected (Initial Decision at 32, RAI-73-2 at 139).

ceipts and costs that no net "benefit" accrued from the production of electricity.

2. No party has pointed to a suitable method for placing a dollar value on the benefits of electricity, and, in line with our discussion above, we believe none exists.[27] In the absence of such a method, the NEPA cost-benefit balancing must proceed along different lines.

In this connection, NRDC relies upon judicial decisions which, it asserts, establish a requirement that a cost-benefit analysis measure not just the costs and benefits of alternatives to the project, but the costs and benefits of the project itself.[28] But none of those decisions contained a full discussion of the application of that general principle concerning

[27] Throughout the Board's opinion and NRDC's brief, heavy reliance is placed, for the proposition, *inter alia*, that a monetary value must be placed upon electricity, upon the May 1972 "Guide for Submission of Information on Costs and Benefits of Environmentally Related Alternative Designs for Defined Classes of Completed and Partially Completed Nuclear Facilities". We note also that Regulatory Guide 4.2, entitled "Preparation of Environmental Reports for Nuclear Power Plants", issued in March 1973, states that the benefits of the electricity to be generated "should also be expressed in dollars by showing expected average annual revenues [with the] basis of assigning dollar values . . . clearly stated". § 8.1, p. 4.2-33.

In order to avoid any confusion on this score, we should observe that guides such as those referred to represent the thinking only of the regulatory staff, not the Commission itself. Indeed, an express disclaimer to that effect appears in Regulatory Guide 4.2, and the May 1972 Guide contains a statement (p. i) that it is "supplementary to the draft" which eventually led to the issuance of Regulatory Guide 4.2. In short, the documents are useful as guides; but they are not regulations and, insofar as the adjudicatory process is concerned, they represent only the opinions of one of the parties to that process and as such cannot be viewed as necessarily controlling. For its part, then, the Licensing Board attributed more significance to the statements in the Guide than was warranted. For our part, the portion of § 8.1 of Regulatory Guide 4.2 quoted above does not alter our conclusion concerning the inutility of attempting to assign a dollar value to the benefits of electricity.

[28] See *NRDC* v. *Morton*, 458 F.2d 827 (D.C. Cir. 1972); *Calvert Cliffs' Coordinating Committee* v. *AEC*, 449 F.2d 1109 (D.C. Cir. 1971); *EDF* v. *Corps of Engineers*, 470 F.2d 289 (8th Cir. 1972).

the implementation of NEPA to the licensing of electric generating facilities. It is appropriate, then, for us to set forth our own view as to the steps which should be followed in conducting a NEPA review of a proposed nuclear-powered electric generating facility.

At the outset, inquiry must be made into whether there exists a genuine need for the electricity to be produced. This inquiry involves not only an analysis of existing generating capacity and of projections of expected growth, but also consideration of the possibility that measures to curtail consumption will be initiated. In this regard, appropriate attention must be given to energy conservation considerations, insofar as they affect the likelihood that predicted demand will in fact ocur.[29] At the same time, however, cognizance can be taken of the effect which a shortage of fossil fuel, or a need to divert that fuel to other uses, might have upon demand for non-fossil fueled generating sources.

On the basis of this information, a preliminary decision can be made as to the extent to which some form of generating facility appears to be justified. Even a decision favorable to the applicant on this score does not, of course, mean that a proposed nuclear facility designed to meet the predicted demand will pass muster. The Commission must still examine the proposal in light of all of NEPA's purposes. At that stage, however, the focus shifts to the relative costs and benefits of alternatives to the proposed facility. Consideration of alternatives to the proposed project must be wide-ranging, embracing, *inter alia,* alternative

[29] The Commission has, in two recent decisions, emphasized that full consideration must be given to appropriately framed energy conservation contentions. *Niagara Mohawk Power Corp.* (Nine Mile Point Unit 2), RAI-73-11 995; and *Consumers Power Co.* (Midland Units 1 and 2), RAI-74-1 19.

generating methods, alternative sites,[30] and alternative auxiliary equipment (*e.g.,* cooling towers). Consideration of these subjects requires a comparison of the relative benefits achieved and costs incurred under each of the alternative proposals, so that the optimum alternative may be selected.

Finally, an overall balancing of costs and benefits occurs, but it is not necessary for this purpose to attempt to place a dollar value on the benefits of the electricity to be produced. Instead, on a qualitative basis, the costs associated with the optimum alternative selected must be balanced against the benefit achieved by meeting the degree of demand anticipated. To be sure, if the facility will satisfy a real demand for electricity that cannot be met by the purchase of power from other systems, then the result of the balancing may be a foregone conclusion in that, as indicated above, the alternative of not meeting the demand is unthinkable.

For the reasons stated, we are compelled to vacate that portion of the initial decision requiring the assignment of a dollar value to the benefits of electricity. Having done that, NRDC's exceptions to the precise manner in which the dollar value was to be assigned (see p. 172, *supra*) are no longer of consequence. Moreover, NRDC's broad objection to the effect that no overall balancing was undertaken (exception 2) must be rejected, since what NRDC views as a "pretense at balancing" (Brief, p. 10) comports with our broad outline of the steps to be followed in fulfilling the purposes of NEPA.

[30] See, *e.g.,* the October 5, 1973 letter from the Director of Regulation to the applicant in Docket Nos. 50-354 and 50-355, *Public Service Electric & Gas* (Newbold Island), stating that "an important requirement in the preparation of an environmental impact statement for a nuclear power plant is, of course, a consideration of alternative sites" and concluding that an alternative location was "a more desirable alternative from an environmental standpoint."

C. The preceding discussion of those of NRDC's exceptions relating to the monetary value of the benefits of electricity touched, in the broadest terms, on the general content of environmental impact statements. In this section, we consider NRDC's remaining exceptions, which assert that there were a number of defects in the environmental impact statement for this particular facility.

1. NRDC's claim that the cost-benefit analysis was "unsystematic and lacked rigor" (exception 1; Brief, p. 7) rests on two narrow assertions: (1) while costs and benefits should have been kept separate, there were "two examples where alleged benefits appeared in the cost section", and (2) "the text of the cost section on the proposed action is randomly interspersed with some but not all of the costs and benefits of some of the alternatives" (Brief, p. 7).

We agree in principle with NRDC's contention that a systematic approach must be brought to bear on the complex questions and decisions involved in conducting and describing a cost-benefit analysis related to a proposed nuclear facility. But examination of the portions of the record referred to by NRDC reveals that the deficiencies allegedly present here are of a minor nature. They stem, not from inadequacies in conducting the cost-benefit analysis, but rather only from the selection of an inartful method of describing some of the relatively insignificant results of that analysis. Contrary to NRDC's claim that their effect has been the "shielding [of] the decision-making process behind a smoke-screen of confusion" (Brief, p. 9), these deficiencies do not prevent the reader of the FES either from gaining a clear understanding of what is involved or from framing a challenge to the facts contained or conclusions expressed therein. Thus, while this exception has some validity in principle, no substantive modifications of the envrionmental statements are called for.

2. By another group of exceptions (numbers 3, 4, 5, 6(ii)-6(v), and 21), NRDC argues that the magnitude of the costs of the project were not disclosed by the environmental impact statement. Specifically, claims NRDC, certain costs were either omitted entirely, not identified with particularity, or not monetarily quantified to a sufficient degree.

NRDC's principal argument in this respect concerned the cost of the fuel cycle, which we have already discussed in connection with NECNP's exceptions *(supra,* pp. 163-164). It also placed heavy emphasis, however, on the allegedly inadequate consideration given to the several types of emissions from the plant, and suggested that a dollar value could readily have been assigned to the adverse environmental impacts of those emissions by considering their effect upon real estate values.

Unlike the claim that the benefits from electricity produced can be represented by a dollar value, NRDC's suggestion concerning consideration of changes in real estate values as a measure of costs holds out some promise. If plant emissions do have an effect on real estate values, measuring that effect would provide a useful, meaningful method for evaluating some of the costs associated with facility operation. But the only evidence in the record on this point was provided by a staff witness whose statements, on cross-examination, appear to indicate that he did not know how the effect, if any, of emissions on real estate values could be measured in the circumstances presented here (Tr. 6174, 6200, 6281, 6286-87). In the face of that testimony, it was incumbent upon NRDC to adduce evidence of its own to demonstrate that its suggestion was, indeed, a workable one. In the absence of such a demonstration, we must proceed on the basis of the uncontradicted testimony rejecting real estate evaluation as a useful tool in this case. The exceptions are denied.

3. A third group of exceptions (numbers 7, 8, 9, 10, 16, 17 and 18) reflects NRDC's view that confusion existed with respect to the "issues concerning secondary benefits" (Brief, p. 16). The short answer to these exceptions is that, as a staff witness pointed out, the secondary benefits listed in the FES *(e.g.,* local taxes and local employment) were mentioned only for informational purposes and did not play a part in the decision to proceed with the proposed project (FES, p. XI-14, par. B.8; Tr. 6175, 6198-99, 6290-91). Because many of the "secondary benefits" consist of transfer payments resulting in offsetting costs and benefits, we agree with the staff and NRDC that they have no place in the overall evaluation of the appropriateness of the project.[31]

4. As we discussed in connection with the reasons why the assignment of a monetary value to the benefits of the electricity to be produced is unnecessary, an environmental impact statement must contain a thorough analysis of alternatives. NRDC asserts that the cost-benefit analysis for this project reflects an inadequate treatment of alternatives (exception 23; Brief, p. 22). Its sole argument in support of this assertion runs along the following lines: (1) the alternative most fully considered in the FES was closed cycle cooling; (2) the Board found this alternative to be inadequately treated, and (3) "it follows" that the staff's less thorough discussion of other alternatives is also below the requisite standards.

The difficulty with this argument is that the Board rejected the staff's conclusion with respect to the closed cycle cooling alternative not because the staff's discussion was inadequate, but because the Board disagreed, *on the merits,*

[31] The Licensing Board modified the FES by "classifying local taxes as a benefit, rather than as a cost which the Staff considered [them to be]" (Initial Decision at 38, RAI-73-2 at 141). Our reading of the FES and the relevant testimony does not, however, reveal that the staff treated local taxes as a cost. In any event, in light of our discussion in the text, above, this "modification" embodies no error warranting corrective action.

with the staff's conclusions. Stated otherwise, the Board believed, based on its evaluation of the facts, that a different alternative than the one selected by the staff should be adopted. From this, it does not "follow" that the conclusions reached by the staff with respect to possible alternatives in other areas should also be rejected, even if the discussion of those alternatives was abbreviated. The question is whether, on the merits, different conclusions with respect to those alternatives should be drawn. Except with respect to the early installation of the off-gas system (discussed in Part II of this opinion, *supra*), NRDC has pointed to no specific deficiencies in the discussion of alternatives, and no evidence indicating that an improper evaluation of alternatives was made. No further inquiry into the question of alternatives is warranted.[32]

5. The final point deserving discussion is NRDC's claim that the staff offered no expert testimony on cost-benefit analysis. This claim is based on NRDC's view that the staff witness, Dr. Paul Fine, was not an expert (Exception 12; Brief, pp. 19-20).

This argument suffers from a number of procedural and substantive defects. In the first place, no objection to Dr.

[32] In addition to its general exception on the question of alternatives, NRDC did file an exception (number 26) directed to the assertedly inadequate discussion of alternative means of decommissioning the facility. But any additional discussion of alternative methods of decommissioning would have been an idle exercise. Decommissioning will not take place for some forty years and, in our judgment, nothing would be less profitable than attempting to evaluate now what method of decommissioning will be deemed most desirable forty years from now, in light of the knowledge which will have been accumulated by that time. And, while NRDC in its Brief (p. 33) calls for an examination of "means of lessening the impact of decommissioning," we are not aware of any measures, and NRDC has pointed to none, that could have been taken in the latter stages of construction that would have lessened the impact of whatever form decommissioning eventually takes. NRDC presented nothing to indicate that the nature of the inquiry it is calling for would be other than entirely speculative and hypothetical. In that circumstance, there was no basis for undertaking such an inquiry.

Fine's qualifications to offer expert testimony was made either when he first appeared or after he concluded his testimony. Indeed, it was not until briefs were filed some forty days later that the question was first raised. Permitting such a late challenge to the qualifications of an expert would be seriously prejudicial to the rights of the party on whose behalf the expert appears and to the orderly conduct of hearings. In administrative hearings and judicial trials, if one "expert" put forth by a party is rejected as not qualified on the basis of a timely challenge, that party may wish to attempt to qualify a different witness to testify as an expert on its behalf. If a meritorious challenge to the qualifications of a witness is permitted to be withheld until after the taking of evidence is concluded, then one of two undesirable results would follow: either (1) the party sponsoring the witness would be deprived of its opportunity to present a different expert; or (2) the hearing or trial would have to be reopened to afford the sponsoring party that opportunity. Neither result would be tolerable. In the absence of a justification for the delay in bringing the challenge, NRDC's challenge must be rejected as untimely.[33] Specifically, to the extent that the claim of inexpertise goes to Dr. Fine's background, training and experience, that claim should have been raised on voir dire. And to the extent that the claim is founded on testimony given by Dr. Fine which, according to NRDC, documented his lack of expertise, that point should have been raised as the testimony unfolded or at the

[33] See McCormick on Evidence, § 70, pp. 149-50: ". . . when the witness is first called to the stand to testify, the opponent must then challenge his competency, if grounds of challenge are then known to him. If not then known, and the cause for disqualification is disclosed in the testimony the challenge may then be made." [footnotes omitted]

time it was concluded, rather than forty days after the hearing closed."[34]

In any event, we think NRDC has failed to establish a lack of expertise on Dr. Fine's part. To the contrary, NRDC itself draws heavily on the opinions expressed by Dr. Fine as support for many of the positions taken in the brief filed in support of its exceptions (see, *e.g.*, Brief, pp. 4-7, 9, 12, 15, 17). And examination of the portions of the transcript which NRDC relies upon as demonstrating Dr. Fine's "confusion" reveals, at most, that Dr. Fine held and expressed opinions at variance from those held by NRDC's counsel. This provides no basis for a determination by us that Dr. Fine lacked the requisite expertise. If it disagreed with his views, the burden was on NRDC to adduce evidence, through experts of its own or some other means,

[34] At oral argument before us, NRDC referred to the procedure utilized in connection with the admission of the FSAR into evidence as justifying the failure to challenge Dr. Fine's entitlement to expert status in a timely manner (Appeal Board Tr. 101-02), 216-17). Having examined the procedure referred to, we have concluded that the Licensing Board's sanctioning of it in no way furnished justification for the course followed by NRDC with respect to Dr. Fine's testimony.

When the FSAR was offered into evidence, some doubt arose as to whether its initial admission into evidence would be viewed as an expression of approval of its contents, and, concomitantly, whether a refusal to object to its admission would constitute waiver of the right to challenge the validity of its contents (see Tr. 585-610). Thus, the Board had to face the question as to whether (1) to admit the FSAR, subject to cross-examination of the sponsoring witnesses and, possibly, a subsequent motion to strike all or part of it, or (2) to withhold ruling on its actual admission pending inquiry into the validity of its contents. As was well within its discretion, the Board determined to follow the former procedure (Tr. 610). A similar procedure appears to have been followed with respect to the admission of the FES (see Tr. 5238-60). But this meant only that, after the FES was admitted, NRDC retained the right to attack its contents through the introduction of further evidence. By thus permitting challenges to the contents of documents to be deferred, the Board in no way relieved NRDC of the obligation to raise in a timely manner objections which it may have had to the qualifications of subsequent witnesses.

tending to show that Dr. Fine's expressed opinions were of such a nature that they called his expertise into question.[35]

V

MISCELLANEOUS ISSUES

A. *Energy Conservation Alternatives.* In its proposed conclusions of law, NECNP pointed to the failure of the Final Environmental Statement to consider, as an alternative to full power operation of this facility, the use of energy conservation measures. In particular, NECNP claimed, the FES did not discuss the elimination of promotional advertising and the redesign of the electric rate structure (Proposed Conclusion 1(b)). The Board rejected the proposed conclusion, without specific discussion (Initial Decision at 47, RAI-73-2 at 144). NECNP's exception 5 asserts that insufficient attention was given to energy conservation. As indicated by our earlier comments (p. 175, *supra),* the general principle advocated by NECNP is a sound one. As previously noted, the Commission has made it plain that energy conservation contentions have a legitimate place in licensing proceedings (see fn. 29, *supra).*[36]

At the time the National Environmental Policy Act was passed, however, this facility had been under construction for two years. At the time the FES was written, the facility was nearly ready for operation. Whatever impact the evaluation of energy conservation measures might have had at the time construction permits were under consideration will be considerably lessened, if not eliminated entirely, at

[35] In light of our denial of NRDC's other exceptions dealing with the environmental impact statement, we deny exception 11, which was not separately briefed and which only summarizes points NRDC made elsewhere.

[36] The Federal Power Commission had adopted a similar policy. See its "Guidelines for Preparation of Applicants' Environmental Reports," par. 8.2 (38 *F.R.* 15944, 15949, 15952, June 19, 1973).

the operating license stage. NECNP itself appears to recognize this, for its energy conservation argument seems to seek, not a ban on facility operations entirely, but only the imposition of limitations on operation during periods when such operation would allegedly be harmful from a radiological or environmental standpoint (Brief, pp. 8-9). As illustrative examples, it suggests *(ibid.)* that utilization of energy conservation measures might permit the imposition of (1) restrictions on operations at times when operational noise is affecting the educational process at a nearby school, or (2) a ban on operations pending the installation of the improved gaseous radwaste system (see Part II, *supra).*

Under the circumstances presented here, there was no occasion for a discussion in the FES of the particular suggestions NECNP now advances as a means of reducing demand. NECNP's comments on the draft environmental statement did not mention these ideas except by way of the very general criticism that "ways of reducing demand are not analyzed" (FES, A-144). Moreover, although not precluded from doing so, NECNP put in no evidence of its own to demonstrate that adoption of such measures would indeed allow more flexibility to impose restrictions on operations at appropriate times. Consequently, the Board would not be expected to impose such restrictions. Finally, the latter of the two suggestions made by NECNP has been mooted (see p. 167, *supra*), while the noise problem referred to in the former will be given full consideration in any event (see pp. 169-170, *supra*).

B. *Allegedly Unsupported Factual Findings.* Several of NECNP's exceptions (numbers 12, 14 and 15) reflect claims that certain factual findings made by the Licensing Board are unsupported by the record. From the manner of presentation of the argument in support of those exceptions (Brief, p. 23 and par. 1 and 3 on p. 24), we gather that those

exceptions relate to factual findings which are not viewed as crucial to the ultimate result reached in the case. We discuss those exceptions briefly.[37]

1. In discussing the environmental impact of the cooling towers, the Licensing Board mentioned its concern with "the inclusion of chemicals associated with river water, such as cadmium [and] mercury . . . , that may be carried off site" (Initial Decision at 16, RAI-73-2 at 134-35). This concern was alleviated, however, by the evidence that there was "no drift of water droplets off site and thus no transport of chemically laden particles" in tests made at 50% of full power (Initial Decision at 16, RAI-73-2 at 135).

In discussing its concern over possible effects from these chemicals, the Board found that "there is no evidence of significant concentrations of those chemicals in the river water" *(ibid.)*. Citing comments filed by the Environmental Protection Agency in response to the draft environmental statement, NECNP excepts to this finding.

EPA's letter did state that "there exist unusually high levels of cadmium and mercury in the Connecticut River" (FES, p. A-75).[38] Thus, NECNP's exception is well taken, at least to the extent that the EPA letter — which was admitted into evidence as part of the FES — establishes the literal incorrectness of the finding that there was "no" evidence of significant concentrations of the two metals. There

[37] NRDC's exception 19 deals with a statement the Board made with respect to its acceptance of the applicant's proposed findings. That exception is denied as lacking in either materiality or specificity, depending upon its purpose.

[38] EPA's concern was not with off-site drift as such. Rather, EPA feared that, as a result of evaporative losses occasioned by cooling tower operation, the concentration of these metals would increase, that is, that there would be even higher concentrations in the cooling tower blowdown than were present in the original river water. This, in turn, could lead to a higher accumulation of these metals in the tissue of fish and other aquatic biota. See FES, pp. A-75–A-76.

was, however, evidence adduced which countered EPA's unparticularized assertion and demonstrated, based on actual monitoring, that the levels of these metals in the Connecticut River are quite low. See FES, p. II-18; Ex. 1 to written Testimony of George Starbuck, following Tr. 5229. That evidence is far more persuasive than EPA's unsupported conclusory assertion.[39]

In any event, NECNP does not urge that we add any conditions to the license to insure that no injury results from the presence of these metals in the cooling tower blowdown. In light of the applicant's commitment to monitor and, if necessary, treat that blowdown, we find it unnecessary to take further action.

2. The temporary operating license issued on September 7, 1972, did not expire until February 28, 1973. Because the hearing was closed on November 9, 1972, NECNP takes exception to the Board's statement in its initial decision, issued virtually contemporaneously with the expiration of the temporary operating license, that there "has not been any injury" to the public in the course of "the operations undertaken pursuant to the temporary operating license" (Initial Decision at 4-5, RAI-73-2 at 131).

It is not clear to us that the Board's statement was intended to cover the period after the hearing closed. If it was, we would agree with NECNP that it was overbroad and unsupported by the record. In addition, it would have

[39] While the evidence referred to rebuts EPA's assertion, the discussion in the FES of EPA's comment was non-responsive. FES, pp. XII-1–XII-2. Thus, that portion of the FES does not discuss the Connecticut River but instead states only that "the concentrations of cadmium and mercury *in waters of rivers in the U.S.* are extremely low" [emphasis added]; even then, it goes on to concede that very low concentrations of mercury and cadmium in water "can produce toxic effects on aquatic organisms," and thus does little to alleviate the concerns expressed by EPA (see fn. 38, *supra*).

been gratuitous for, as NECNP points out (Brief, p. 23), "there was no attempt to explore this issue" in the hearing. For precisely these reasons, we have not given any weight to this statement of the Board in reaching our decision. Any error that might have been committed is, therefore, harmless.

3. NECNP asserts that there was no record basis for the Board's finding that "the present shutdown", which took place after the record was closed, "was undertaken out of an abundance of caution on an emergency basis to examine and determine the extent of the effect" from fuel rod hydriding (Initial Decision at 11, RAI-73-2 at 133). Again, NECNP's exception is technically well-taken. But the exception ignores that NECNP itself had urged at oral argument before the Licensing Board that the shutdown constituted the "first refueling outage" at which the applicant was committed to install the advanced off-gas system (Oral Argument Tr. 163). We view the Board's finding as nothing more than a response to that argument, premised on an analysis of the situation as counsel had represented it to exist. In any event, the point is now moot (see p. 167, *supra*).

C. *Continued Service of Documents.* The Licensing Board refused NECNP's request that it require the continuation, during the full term of the license, of the practice, followed during the hearing, of serving all applicant-staff correspondence relating to the facility upon the parties and the Brattleboro public document room. NECNP's challenge to that ruling (exception 16) is met by the applicant's argument (apparently endorsed by the staff) that no rule or regulation requires such service to be continued.

We believe that the questions of continued service upon the parties and continued maintenance of the document room are governed by different considerations. The parties' entitlement to personal service derives from their participation in an ongoing administrative proceeding. That right is different in nature from the right, if any, of the public generally to access to relevant documents in the vicinity of the plant.

With respect to service upon the parties, our decision is controlled by our view that a contested licensing proceeding cannot be said to be fully completed until judicial review has been concluded (or the time for seeking such review expires without review having been sought). Moreover, during the course of judicial review, the parties have the right to request the court to remand the case to the Commission for the consideration of new evidence. 28 U.S.C. 2347(c). Although such a request may well be less freely granted than a request to reopen a hearing prior to issuance of an initial decision (see ALAB-138, *supra,* RAI-73-7 at 523), the two rights are analogous insofar as their effective exercise, in circumstances where time is of the essence, requires ready and rapid access to new information. For these reasons, we hold that the practices with respect to service of documents upon parties followed during the course of the administrative proceedings must continue unabated during the period allowed for seeking judicial review; thereafter, during the pendency of judicial review, those practices must continue unabated with respect to those parties who participate in the judicial review proceedings.[40]

While the service of documents upon the parties must, therefore, be continued for a time, we have concluded that

[40] Nothing we say here, of course, is intended to preclude some or all of the parties from entering into voluntary arrangements to continue serving documents after judicial review has been concluded. And, the issue not having been presented here, we express no opinion as to whether a party is entitled, after judicial review has been concluded, to personal service of those documents which relate to a continuing reporting or monitoring requirement imposed in connection with the resolution of an issue as to which the party had played an active role in the hearing.

there need not be continued maintenance of a document room in the locality of the plant. No statutory or regulatory provision expressly requires the maintenance of such a room; indeed, since the Commission has by regulation provided for a general public document room in Washington, D. C. (10 CFR 2.790, 9.7),[41] it is fair to draw the negative inference that the Commission presently intends that no other document room need be maintained.

NECNP argues, however, that the existence of a local document room is necessary to preserve and make effective the public's right "to utilize the procedures for suspension or revocation of a license under 10 CFR Part 2, Subpart B" (Brief, p. 25). This argument has some force. Thus, although it is unstated in the regulations, the practice in recent times has been to afford the public a right to utilize those procedures by requesting the Commission or the Director of Regulation to initiate proceedings, by the issuance of a "show cause" order, to modify, suspend or revoke a license. 10 CFR 2.202.

We can also agree with NECNP's theory that statutes or regulations conferring substantive rights can be read as conferring also those procedural rights necessary to an exercise of the substantive right. See, *e.g.*, *Steele* v. *Louisville & Nashville RR Co.*, 323 U.S. 192, 204 (1944). Where we part company with NECNP is on the proposition that the existence of a local public document room is a procedural right necessary to the exercise of the right to call for the initiation of a "show cause" proceeding. There are alternative methods by which the public can obtain information. These methods include the use of the Washington, D. C. Public Document Room and the exercise of the rights conferred by the Freedom of Information Act. See 10 CFR

[41] Document rooms serving limited purposes are maintained at certain major operating field offices. 10 CFR 9.7, 1.3(b).

9.8. In the absence of the time constraints which exist during the course of the basic licensing proceeding, these alternative methods are adequate to permit effectuation of the right to call for a "show cause" proceeding.

In short, there is no "necessity," in the legal sense, for the continued maintenance of a local document room.[42] But there certainly is a substantial degree of administrative burden attached to maintaining such a room. In this connection, the requirement NECNP would have us impose would be applicable to all reactor facilities, since NECNP's argument does not rely upon any special circumstances associated with this facility. For these reasons, and because the Commission has provided by rule for the Washington, D. C. document room, we believe that the question as to whether local document rooms should be maintained during the life of a facility license is one that can be addressed only by the Commission in the exercise of its rulemaking authority and not by this Board in the exercise of its adjudicatory functions.

D. *An "Unresolved" Matter.* In a footnote to its opinion, the Licensing Board observed that during the proceeding below it had raised a question concerning the staff's recommendation that during operations the containment atmosphere be inerted by the use of nitrogen (Init. Dec. p. 12, fn. 3, RAI-73-2 at 133). As the Board related it, the applicant had objected to this recommendation but had not called for resolution of the dispute in the hearing. According to the Board, the staff had failed to furnish data which the Board

[42] In our opinion, no such necessity may be inferred from the fact that a local public document room is maintained during the course of a proceeding. Even if — and we do not intend to intimate a view on this question — such a room were deemed "necessary" to the effective exercise of certain rights at the hearing stage (*e.g.*, the right to petition for leave to intervene in the hearing), that would not be determinative as to whether it is necessary to the exercise of rights existing at a later stage.

had requested on this point. Having said that, the Board terminated its discussion by noting that the question remained "unresolved" *(ibid.)*.

We have been supplied with no record references which would have enabled us to ascertain the precise nature of the Board's expressed concern. We note, however, the concern of the Advisory Committee on Reactor Safeguards (ACRS) that a consequence of inerting may be to make more difficult "inspection and repair of the primary system".[43] As we understand it, inerting has the intended purpose of mitigating the potential consequences of a very unlikely accident. In achieving that purpose, it can have the adverse consequences of hampering thorough inspection and repair activities (thereby threatening to increase the possibility of the accident whose consequences are intended to be mitigated) and posing a health and safety threat to one segment of the public, *i.e.*, plant workers.[44]

The question raised by the Board should not have remained unresolved. As we noted in an earlier opinion, this operating licensing proceeding is governed by the former version of the Rules of Practice, whereby issues other than those raised by the parties may be considered by the adjudicatory tribunals (ALAB-124, *supra,* RAI-73-5 at 362, fn. 4). The issue raised by the Board is a significant one which has been the subject of discussion for some time.

In view of the lengthy period during which this proceeding has been before us, we are reluctant to defer any longer our complete resolution of all the issues presented. Yet the issue of the advisability of inerting is not susceptible of resolution on the existing record (which to our knowledge

[43] See p. 3 of the March 9, 1971 ACRS "Report on Vermont Yankee Nuclear Power Station."

[44] See, in the latter respect, *Iowa Electric Light and Power Co.* (Duane Arnold Energy Center), ALAB-134, RAI-73-7 483.

is silent on this issue) and we believe that to leave the issue unresolved would constitute an abdication of our responsibilities. For these reasons, we are directing that the following memoranda be submitted to us:

(A). If the applicant and staff have reached a mutually satisfactory resolution of this issue, a memorandum from the staff by Friday, March 8, 1974 (with replies, if any, from other parties by Wednesday, March 20, 1974), delineating (1) the substance of the solution; (2) the basis for the belief that the safety questions raised by the Licensing Board and the ACRS have been satisfactorily resolved; and (3) a suggested approach for submitting the matter to this Board for resolution on the record.

(B). If the applicant and staff have not reached a mutually satisfactory resolution of this issue, a memorandum from each of these parties by Friday, March 8, 1974 (with replies from them and any other interested parties by Wednesday, March 20, 1974) delineating (1) the substance of each party's position on the issue; (2) the basis for the belief by each that adoption of its position would constitute a satisfactory resolution of the safety questions presented; and (3) a suggested approach for resolving the issue on the record.

VI

CONCLUSION

For the reasons stated, the exceptions are *denied* except insofar as granted in part herein.[45] The parties shall continue to serve documents in accordance with the requirements set forth herein. Condition A to the license is to be rewritten to read as follows:

Applicant shall operate the facility only under the closed cycle mode of cooling until, in the opinion of the advisory group for non-radiological monitoring (estab-

[45] Even though certain exceptions have been granted in part, the effect of that action has not been to disturb the existing operating license authorization.

lished by Section 2.2.2 of the Technical Specifications, as amended), (1) sufficient data have been obtained to establish an environmental base-line so that changes produced by other modes of cooling can be properly evaluated, and (2) in light of such data, there is reasonable assurance that testing of other cooling methods will not itself result in significant adverse effects on the environment. Thereafter, with the approval of the AEC Regulatory Staff, operations utilizing other modes of cooling for testing purposes may be undertaken. Upon completion of the tests, the advisory group shall make recommendations to the staff concerning the permanent restrictions, if any, which should be placed upon operations under other than the closed cycle mode of cooling.

In accordance with our established practice, we have examined those portions of the initial decision to which no exceptions were taken. With the possible exception of the question of inerting, our examination does not disclose any error on the Board's part which would affect the validity of its conclusion that the authorization of the issuance of an operating license was merited by the evidence.

Accordingly, subject to the outcome of the presently-unresolved question of inerting, and except insofar as modified herein, the initial decision is *affirmed*.

It is so ORDERED.

FOR THE ATOMIC SAFETY AND
LICENSING APPEAL BOARD

MARGARET E. DUFLO
Secretary to the Appeal Panel

ATOMIC ENERGY COMMISSION REPORTS

Volume 5

OPINIONS AND DECISIONS OF THE
ATOMIC ENERGY COMMISSION
WITH SELECTED ORDERS

July 1, 1972, to December 31, 1972

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD:

Sidney G. Kingsley, *Chairman*
Dr. John H. Buck
Dr. Lawrence R. Quarles

Docket Nos. 50-329, 50-330

In the Matter of

CONSUMERS POWER COMPANY
(Midland Plant, Units 1 and 2)

Memorandum and Order

(ALAB-60)

This is a proceeding on an application for construction permits for two pressurized water nuclear power reactors,

each with an initial power rating of 2452 thermal megawatts, to be located on the shore of the Tittabawasse River adjacent to the city limits of Midland, Michigan. An atomic safety and licensing board presiding over the hearing has referred to us, pursuant to 10 CFR 2.730(f), its order of March 10, 1972 concerning the extent to which all aspects of the fuel cycle "from the mining of uranium to the ultimate storage of high level wastes" are to be considered in this proceeding. The referral raises the question of the scope of the Commission's duties in conducting the environmental study required by Section 102(2)(C) of the National Environmental Policy Act, 42 U.S.C. 4332(2)(C).

The order of the Atomic Safety and Licensing Board is that the environmental effects of the mining, production and fabrication of nuclear fuel and the handling of spent fuel, including its chemical reprocessing and waste storage, are at issue in this proceeding only with respect to:

1. Transportation of fuel elements from a fuel fabrication plant to the reactor site;

2. Transportation of spent fuel elements from the reactor site to a fuel reprocessing plant;

3. Transportation of packaged radioactive material from the site to low level waste burial grounds; and

4. Radioactive discharges at the site and any other environmental effects directly associated with the handling and use of fuel at the site.

The Board's referral arises primarily from the contentions of several groups of intervenors. The State of Kansas is particularly concerned with the possibility that certain wastes from nuclear power reactors in general might be stored in the State of Kansas, but it has associated itself generally with the objections of the intervenors.[1] The

[1] The possibility of underground storage of nuclear wastes in abandoned salt mines in Kansas has been considered by the Commission, but other alternatives are now being explored. See H. Rept. No. 92-1066, 92d Cong. 2d. Sess. 11-12.

Board's referral is phrased in terms of the entire fuel cycle, as are the intervenors' contentions. The basic position of the intervenors is substantially similar to that of the intervenors in *Matter of Vermont Yankee Nuclear Power Corporation* (Docket No. 50-271), which was the subject of our memorandum and order of June 6, 1972,—AEC—.

The Commission's regulatory staff has filed a voluminous final detailed statement on environmental considerations after receipt of comments from the public, the Council on Environmental Quality, and other Government agencies as required by the Commission's regulations, 10 CFR Part 50, Appendix D.[2]

The Licensing Board has recommended that, under the authority of 10 CFR 2.785(d), we refer its rulings to the Commission as raising novel questions of law and policy. We decline to do so on the grounds on which we rested such a decision in *Matter of Vermont Yankee Nuclear Power Corporation*,—AEC—(June 6, 1972), and on the additional ground that, as to portions of the fuel cycle concerned with the reprocessing of irradiated nuclear fuel and the disposal of wastes after irradiation of fuel in a reactor, the Commission has permitted that decision to stand. See 10 CFR 2.786.

On the basis of our decision in *Vermont Yankee* and for the reasons expressed there, we hold that the order of the Licensing Board is affirmed as to the environmental effects of the handling of spent fuel, including chemical reprocess-

[2] 36 F.R. 18071, September 9, 1971. See also 36 F.R. 18716, September 21, 1971; 36 F.R. 19153, September 30, 1971; 36 F.R. 21579, November 11, 1971; 36 F.R. 23900, December 16, 1971; 37 F.R. 864, January 20, 1972; 37 F.R. 9619, May 13, 1972; 37 F.R. 9779, May 17, 1972.

ing and waste storage. And we now extend that interpretation of the National Environmental Policy Act to earlier stages of the fuel cycle.

The issue as to the part of the fuel cycle before the irradiation of fuel in a reactor raises the question which we considered in *Vermont Yankee;* the definition, for the purposes of the Environmental Policy Act, of the "project" or "action" of the agency under Section 102 of the Act, 42 U.S.C. 4332, and the Commission's regulations, 10 CFR 50, Appendix D. Again the question is identification of the "major Federal action significantly affecting the quality of the human environment" (National Environmental Policy Act, Section 102(2)(C), 42 U.S.C. 4332(2)(C) which this agency is now undertaking. What this agency is undertaking is consideration of the issuance of permits to construct two individual power reactors.

The fuel to be used in these reactors will be of a common type: an array of fuel rods each of which consists of uranium dioxide sealed in cylindrical zirconium alloy containers. The uranium is mined as ore which is later pulverized at uranium mills. It is then dissolved by chemical means at processing plants, and the dissolved uranium is recovered and calcined to yield uranium oxide powder. This powder is refined at various plants to yield essentially pure uranium oxide. By successive chemical processes, the oxide is converted to crystalline uranium fluoride. The fluoride is converted to a gas, uranium hexafluoride. The gas is enriched at gaseous diffusion plants; the diffusion process separates it into a product having a concentration of the isotope uranium-235 higher than in normal uranium, and a depleted fraction having a uranium concentration lower than normal.

The enriched uranium is converted by chemical processes to uranium dioxide (or some other solid compound), is prepared in an appropriate physical form, and is then clad in

zirconium alloy (or stainless steel) to produce fuel elements. After irradiation in a reactor, the fuel is reprocessed in a reprocessing plant by chemical solution of the fuel elements and the separation of useful uranium and plutonium for recycling for future use. Under current practice these successive processes of mining, milling, refining, enrichment, conversion, fabrication, irradiation, and reprocessing constitute the fuel cycle.[3]

There are over 200 uranium mines in this country alone, some underground and some of the open pit type, as well as other sources of uranium.[4] Twenty mills are in operation or scheduled to go into operation during the current calendar year; four plants are engaged in the conversion of feed materials to uranium hexafluoride, and there are competing foreign plants; there are three gaseous diffusion plants operated for the Commission; nine plants are engaged in later stages of processing, and fourteen plants are engaged in fabricating nuclear fuel.[5]

The facilities engaged in preparing fuel for use in power reactors are either operated or licensed by the Commission. From the time when the raw uranium ore is pulverized at the mill, uranium is source material as defined by the Atomic Energy Act, and its possession or other dealing with it is required to be licensed under the Act.[6] Enrich-

---

[3] See Hogerton, *Atomic Fuel* (U.S. Atomic Energy Commission 1967); Singleton, *Sources of Nuclear Fuel* (U.S. Atomic Energy Commission 1968).

[4] Statistical Data of the Uranium Industry, January 1, 1972 (USAEC 1972, Report No. GJO-100.)

[5] The Nuclear Industry 1971 (USAEC Report No. WASH-1174-71, pp. 5, 18, 20, 23, 26-7, 39).

[6] Atomic Energy Act of 1954, Secs. 11(z),(62), 42 USC 2014(z); 2092; 10 CFR 40. An exemption for unrefined and unprocessed ore is based on the Commission's finding that there is no need to license it from the standpoint of either public health and safety or the national security. See 10 CFR 40.4(h), 40.13(a)(b).

ment in the gaseous diffusion plants [7] creates special nuclear material as defined by the Act, as to which such activities are also required to be licensed.[8] Facilities dealing with source material are thus operated under license,[9] and those involved with special material are licensed as either production facilities or as utilization facilities.[10]

When in December of 1970 the Commission published amendments of Appendix D of Part 50 of its regulations, implementing the Environmental Policy Act (35 F.R. 18469, December 4, 1970; see also 35 F.R. 5463, April 2, 1970), it defined the scope of the procedures thus prescribed as extending to power reactors and fuel reprocessing plants (Appendix D, par. 1, 35 F.R. 18473). It also directed that compliance with the Environmental Policy Act be extended to other facilities handling source material and special nuclear material in the various stages of the fuel cycle:

> Procedures and measures similar to those described in the preceding paragraphs of this appendix will be followed in proceedings other than those involving nuclear power reactors and fuel reprocessing plants when the Commission determines that the proposed action is one significantly affecting the quality of the human environment. The Commission has determined that such proceedings will ordinarily include proceedings for the issuance of the following types of materials licenses: (a) Licenses for possession and use of

[7] The gaseous diffusion plants are owned by the Commission and operated for it by operating contractors. See Hiestand and Florsheim, *The Atomic Energy Commission Management Contract Concept*, 29 Fed. B.J. 67(1969).

[8] Atomic Energy Act of 1954, Secs. 11 aa., 53, 42 USC 2014 (aa), 2073, 10 CFR 70.

[9] 10 CFR 40.

[10] Atomic Energy Act of 1954, Secs. 11 v., 11 cc., 42 U.S.C. 2014(cc); 10 CFR 50.2(a), 50.2(m), 50.2(b).

> special nuclear material for fuel element fabrication, scrap recovery and conversion of uranium hexafluoride; (b) licenses for possession and use of source material for uranium milling and production of uranium hexafluoride; and (c) licenses authorizing commercial radioactive waste disposal by land burial. (Appendix D, 35 F.R. 18474, now par. A. 14.)

The Commission soon adopted regulations explicitly requiring that an application for a license to process and use source material which will significantly affect the quality of the human environment be accompanied by an environmental report under Appendix D, imposing compliance with Appendix D as a prerequisite for a license, and imposing similar requirements for special nuclear material licenses.[11] The consequence is that each significant licensed activity at each successive stage of the fuel cycle requires a separate environmental statement complying with the Environmental Policy Act and with Appendix D.[12]

There is no material difference between this reactor licensing proceeding and any other, and the intervenors do not appear to claim that there is. What they assert is that, notwithstanding the existing elaborate pattern of compliance with the mandate of the Environmental Policy Act at the various stages of the fuel cycle, it is the Commission's duty in this (and in every other) individual reactor licensing proceeding to take evidence upon and to consider the environmental consequences of every aspect of the whole fuel cycle.[13]

[11] 10 CFR 40.31(f), 40.32(e), 10 CFR 7.21(f), 70.23(h), 36 F.R. 12731, July 7, 1971.

[12] An exemption for unrefined and unprocessed ore is based on the Commission's findings that there is no need to license it from the standpoint of either public health and safety or the national security. See 10 CFR 40.4(h), 40.13(a)(b).

[13] As the so-called Mapleton intervenors put it:

> In general, Mapleton believes that all adverse environmental

The intervenors' suggested extension of the environmental study to uranium mining and tailings illustrates the extent of the remoteness and generality of what they contend must be analyzed in this proceeding, its lack of any specific relation to the project before us, and its departure from what we believe to be required by the Environmental Policy Act. The health aspects of uranium mining and the problem of tailings have been the subject of extensive consideration by Congress and by other public authorities.[14] We recognize of course that an agency's duty to conduct an environmental study is not limited by its statutory authority,[15] but the universality of what the intervenors claim and its remoteness from an environmental study of the specific project before us—the licensing of these two reactors—is perfectly plain.

The intervenors even seek to extend the environmental study in this proceeding to such subjects as the production of uranium by means not presently developed, such as the liquid metal fast breeder reactor.[16] The development of this

---

effects and social and economic costs associated with the nuclear fuel cycle, to wit, mining, milling, feed material preparation, fuel enrichment, fuel fabrication, reactor operation, transportation, fuel reprocessing, and ultimate high-level radioactive waste storage and disposal should be considered in this proceeding.

Counsel for the intervenor Environmental Defense Fund and for the intervenors Saginaw Valley Nuclear Study Group and others explicitly concur in such an all-embracing view of the study to be undertaken.

[14] See Hearings, Use of Uranium Materials for Construction Purposes, October 28-29, 1971, and Summary Analysis of Hearings, 39-44, 12-13; see also P.L. 92-314, Title II, approved June 16, 1972; H. Rept. No. 92-1066, 92d Cong., 2d Sess., 7-8, 47-49.

[15] See *Natural Resources Defense Council* v. *Morton*, 458 F. 2d 827, 834-5 (D.C. Cir. 1972).

[16] The Saginaw Valley intervenors argue: "Since the proposed plant may rely upon nuclear fuel created by a Breeder, the risks

type of reactor is in its early stages, and is a matter of national policy [17] which has no specific relationship to the subject matter of this proceeding. The Commission has already published an environmental study of a demonstration fast breeder project.[18] Undertaking to weigh here its probable environmental consequences by the standards of the Environmental Policy Act and under the procedures of Appendix D would be an exercise in futility which would be duplicitous, premature and far beyond the reasonable scope of the present case. That would be even more true of such a study of other means under development.

We are deeply conscious that, in enacting the Environmental Policy Act, Congress intended that the phrase "to the fullest extent possible" in Section 102 should not be understood as authorizing the avoidance of the duties imposed by that Section, and that Congress intended that an agency comply with the directives in Section 102 unless existing law makes full compliance impossible. (See Conference Report, H.Rept. 91-765, 9-10). But, as we pointed out in the *Vermont Yankee* case, our duties under the Environmental Policy Act are defined by the proposed "project" or "action" before the agency. We cannot accept that it was the purpose of Congress, in adopting the Environmental Policy Act, to impose such a remote, conjectural and multiplicitous requirement on this proceeding as the intervenors assert, and as an inference to do so in every reactor licensing proceeding.

---

and costs of the development and operation of Breeders must be analyzed against any alleged or asserted benefits, if any, that may be gained by construction and operation of the proposed Plant."

[17] See Message from the President of the United States Transmitting a Program to Insure an Adequate Supply of Clean Energy in the Future, June 4, 1971, 92d Cong., 1st Sess., H. Doc. No. 92-118.

[18] Environmental Statement, Liquid Metal Fast Breeder Reactor Demonstration Plant (April 1972, Report No. WASH-1509).

There is no way of ascertaining in the present proceeding what plants in the various earlier stages of the fuel cycle will be engaged in one stage or another of the production of fuel for this plant among others. There is no way in which one can now even tentatively identify, over the prospective life of the proposed installation spanning perhaps four decades, the specific mines, mills, refining and conversion plants, and fabrication facilities which will from time to time be involved in furnishing the fuel for these reactors.

In any case, we cannot believe that Congress intended that in the proceedings for the licensing of each individual power reactor there be conducted an environmental study of the present and future operations of an entire industry, including complex and perhaps unidentifiable operations performed by unidentifiable persons at unidentifiable locations under unidentifiable conditions. To embark on such a venture would plunge us into a labyrinth of indeterminacy. What we regarded in *Vermont Yankee* as impossible would here be ernormously compounded.

We held in the *Vermont Yankee* case that, under the principles enunciated by the Court of Appeals for the District of Columbia in *Natural Resources Defense Council* v. *Morton*, 458 F. 2d 827 (1972), the Environmental Policy Act is to be construed in the light of reason, and that the environmental study required by that Act for an individual power reactor does not extend to reprocessing and the ultimate disposal of wastes. We now conclude that, for the reasons expressed in the *Vermont Yankee* case and in this memorandum, the order of the Licensing Board dated March 10, 1972 should be affirmed.

It is therefore ORDERED:

1. Certification to the Commission of the order of the Atomic Safety and Licensing Board dated March 10, 1972 is denied;

2. The order of the Atomic Safety and Licensing Board dated March 10, 1972 is affirmed.

ATOMIC SAFETY AND LICENSING
APPEAL BOARD

WILLIAM L. WOODARD
Executive Secretary

Dated: July 19, 1972

LBP-72-34

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

Docket Nos. 50-329, 50-330

In the Matter of

CONSUMERS POWER COMPANY
(Midland Plant, Units 1 and 2)

HEADNOTE

The Atomic Safety and Licensing Board authorized issuance of a construction permit to Consumers Power Company for the construction of a dual purpose pressurized water nuclear power plant. The plant, consisting of two units will produce about 1300 megawatts of elctricity and also 4,050,000 pounds of process steam for sale to Dow Chemical Company's Midland plant, located on adjacent land. The permit is issued subject to any changes in the criteria for emergency core cooling systems and to undertakings by the Applicant to conduct a number of ecological studies and develop surveillance programs including a study of the intensity and extent of fogging and icing from the cooling pond.

APPEARANCES

RICHARD G. SMITH, Esq., JOHN K. RESTRICK, Esq.,
ROBERT LOWENSTEIN, Esq., and HAROLD REIS, Esq.
on behalf of Consumers Power Company, *Applicant*

MILTON R. WESSELL, Esq. and JAMES N. O'CONNOR, Esq.
on behalf of Dow Chemical Company, *Intervenor*

MYRON M. CHERRY, Esq.

on behalf of
Saginaw Valley Nuclear Study Group, Citizens Committee for Environmental Protection of Michigan, Sierra Club, United Automobile Workers of America, West Michigan Environmental Action Council, and University of Michigan Environmental Law Society,
Intervenors

WILLIAM J. GINSTER, Esq. and IRVING LIKE, Esq.
on behalf of Residents of Mapleton, *Intervenors*

JAMES A. KENDALL, Esq.
on behalf of Midland Nuclear Power Committee, *Intervenor*

WILLIAM H. WARD, Esq.
on behalf of State of Kansas

CURTIS G. BECK, Esq.
on behalf of the State of Michigan

THOMAS F. ENGELHARDT, Esq. and DAVID E. KARTALIA, Esq.
on behalf of the Regulatory Staff of the Atomic Energy Commission

Initial Decision

I. BACKGROUND

1. On January 13, 1969, Consumers Power Company ("Applicant") filed with the Atomic Energy Commission ("AEC") an application for a license to construct and operate a dual purpose pressurized water nuclear power plant.[1] The proposed plant, designated the Midland Nuclear Plant, Units 1 and 2 ("Plant"), would produce approximately 1300 megawatts of electricity and 4,050,000 pounds of process steam for sale by Applicant to the Dow Chemical Company. It would be located on Applicant's approximately

[1] The Application and its 21 amendments are collectively referred to as the "application" or the "PSAR".

1200-acre site on the south shore of the Tittabawassee River in Midland County, Michigan.

2. Upon completion of the Staff review,[2] the AEC, on October 29, 1970 (35 *F.R.* 16749) published a Notice of Hearing pursuant to which a pre-hearing conference was to be held on November 17, 1970, and the hearing was to begin on December 1, 1970. On or before November 17, 1970, as required by the Notice of Hearing, petitions to intervene were filed by the Dow Chemical Company (Dow) and the Midland Nuclear Power Committee[3] in support of the application. Against the application, a joint petition to intervene was filed by the Saginaw Valley Nuclear Study Group, Citizens Committee for Environmental Protection of Michigan, Sierra Club, United Auto Workers of America, Trout Unlimited, West Michigan Environmental Action Council and University of Michigan Environmental Law Society (hereinafter collectively called "Saginaw Intervenors") and a separate petition by the Environmental Defense Fund (EDF).[4] These petitions were granted by the Board in its Order dated November 24, 1970. A late petition to intervene against the application filed by six residents of the community of Mapleton ("Mapleton Intervenors") was granted by the Board's Order of December 8, 1970.

---

[2] Prior to completion of the Staff review, the application was reviewed by the Advisory Committee on Reactor Safeguards (ACRS), the ACRS Reports, dated June 18, 1970 and September 23, 1970 were admitted into the record (Applicant's Ex 4 and Ex 5) as required by law (42 U.S.C. § 2232(b)) for the sole purpose of showing compliance with the statute and not as evidence of the truth of any statement therein.

[3] The Midland Nuclear Power Committee did not actively participate in the hearing.

[4] Trout Unlimited and Environmental Defense Fund withdrew from the proceeding before the hearing on environmental matters. (Tr. 5685-86)

3. On December 1, 1970 the Hearing was begun for the purpose of receiving limited appearances. Limited appearances in favor of the application were made by the following individuals and organizations: Harold Krefft for Federal Power Commission; William G. Turney for Michigan Water Resources Commission; Donald E. VanFarowe for Michigan State Air Pollution Control Commission; James Woodruff for Michigan Public Service Commission; John A. Rapanos; Franklin E. Braman for Board of Directors of Downtown Bay City, Inc.; Hon. Julius Blasy, Mayor, City of Midland; Frank Olds, Chairman, Board of Commissioners, Midland County; Robert B. Chatterton, Supervisor Midland Township, Midland County; Dr. Sidney Smock for Midland Hospital Association; Fred L. Yockey, City Manager, City of Midland; Dr. Edward L. Kern, President, High Performance Technology, Inc.; Clifford Mapes, Vice Chairman, Midland County Road Commission; Ned Arbury, President, Arbury & Sons Insurance; Milton Getzendaner, President, Midland Nature Club; H. C. Allison, Vice President, Alden B. Dow Associates, Inc.; Fred Minzer for Minzer Realty; J. R. Buckely, Vice President, Mutual Savings and Loan Association; Roy Lanham, President, Brown Lumber, Inc.; John A. Miller; Alan Ott, Vice President and Director, Chemical Bank and Trust Company; Rev. Theodore M. Greenhoe for Memorial Presbyterian Church; Robert Ferries, President, Ferries and Maxwell Insurance Agency, Inc.; James G. Bandeen, President, Bandeen Chevrolet; Arthur E. Maass, Superintendent, Wastewater Department, City of Midland; Lyn DeVries for Midland Business and Professional Womens Club; Robert Parker, Executive Vice President, Midland Area Chamber of Commerce; William H. Meier, President, Meier Studio and Camera Shop; Robert Kingsley, Director of Elementary Education, Midland Public Schools; George B. Ulmer; Robert Copeland, Chairman, Midland Section, American Institute of Chemical Engineers; Lewis Warren, Executive Vice President, Greater Saginaw Chamber of

Commerce; William Demers, President, Lumber Dealers Association; Robert R. Denison, Airport Manager, Tri-City Airport Commission; Bruce R. Benway, Vice President, First National Bank; Larry Reed, Executive Vice President, Bay Area Chamber of Commerce; George Elleson, Bay County Industrial Development Corp.; and James L. Collison, Executive Director, East Central Michigan Economic Development District. Limited appearances opposing issuance of the construction permit were made by Georgena Goff and Wendell Marshall. Limited appearances expressing interest in procedural or safety matters related to the Plant but not opposing issuance of a construction permit were made by Thomas Doyle for Michigan Department of Natural Resources; Judith Boli for Sagniaw YWCA; William Foster; and Frederick L. Brown, President, Michigan United Conservation Clubs.

4. After the limited appearances, the hearing was adjourned to permit opposing intervenors to have discovery and prepare for the hearing. Among the contentions of opposing intervenors were several relating to "environmental" (as opposed to radiological health and safety) matters. Under the controlling regulations of the AEC, environmental issues could not be raised in the proceeding. On April 27, 1971, the Board held Intervenors' challenge to those regulations insufficient, thereby excluding all environmental questions from the proceeding.[5]

5. The hearing on radiological health and safety questions resumed on June 21, 1971, and continued on seventeen days until July 23, 1971, when it was adjourned.[6] Coin-

[5] Except as to the conformance of the Environmental Impact Statement with the Regulations, an issue which later developments made academic.

[6] At that time the hearing on radiological matters was substantially completed, except as to the question of the emergency core cooling system (ECCS). By Order dated March 10, 1972, the record

cidentally, on the same day the United States Court of Appeals for the District of Columbia (in *Calvert Cliffs Coordinating Committee* v. *AEC*, 449 F. 2d 1109 (1971)) held that the AEC regulations did not comply with the National Environmental Policy Act. (42 U.S.C. §§ 4321-49 (1970)). One effect of the *Calvert Cliffs* decision was to require that environmental matters be heard in pending proceedings, including this proceeding.

6. Following the adoption of new regulations, the AEC published, on December 4, 1971, a Supplemental Notice of Hearing on environmental matters. A timely petition for intervention on environmental issues by Steve J. Gadler was denied by the Board on February 9, 1972.[7] (By Order of March 31, 1972, the Atomic Safety and Licensing Appeal Board sustained the denial.)

7. On October 19, 1971, pursuant to the revised Regulations, Applicant duly filed its Supplemental Environmental Report (ASER).[8] This was followed by preparation of the Staff Draft Environmental Statement and the circulation of that statement for comment as required by law. The Final Environmental Statement (FES) was then prepared and notice of its availability was published on April 7, 1972 (37 CFR 7012).

---

was closed on radiological questions except ECCS and the iodine spray removal system.

[7] On September 13, 1971, the State of Kansas petitioned to intervene to challenge the AEC decision to locate an ultimate high-level waste depository in Kansas. The Board permitted the intervention for the limited purpose of arguing the legal question whether high-level waste storage was an issue in this proceeding. By Order dated March 10, 1972, the Board ruled that high-level waste storage was not an issue in the proceeding, but referred its decision to the Appeal Board. The latter agreed. Kansas has not otherwise participated in the proceeding.

[8] Applicants' original Environmental Report (AER) was filed on July 24, 1970 under then controlling regulations.

8. Evidentiary hearings on environmental matters began on May 17, 1972, and ended on June 15, 1972, after fourteen days of hearings.

9. This proceeding is a contested proceeding within the meaning of the regulations. It should be pointed out, however, that Saginaw Intervenors who took the laboring oath in the radiological hearing did not participate in the environmental hearing and have not filed proper proposed findings[9] or conclusions even on radiological matters, although directed to do so by the Board's Order of June 28, 1972. Mapleton Intervenors' participation in the radiological hearing was relatively limited but they fully participated in the environmental hearing. Unfortunately, their proposed findings fall far short of the specification and detail required by the Regulations, and do not serve the purpose for which they were required.[10] As Applicant has noted both Mapleton and Saginaw are in default; as Applicant has also conceded, it is not clear what should be done about the default. The Board might, we suppose, strike the intervention and treat the proceeding as uncontested. This would not make sense in the circumstances. The opposing Intervenors by their participation strongly influenced the conduct of the proceeding and their work should not be ignored. On the other hand, we are troubled by the notion of opposing Intervenors that they can avoid the burden

[9] Saginaw did file a paper entitled "Proposed Findings of Fact and Conclusions of Law" but as to environmental issues they expressly state that "they have no conventional findings of fact to set forth." As to radiological issues, they state that they "have not chosen to search the record and respond to this proceeding by submitting citations of matters which we believe were proved or disproved." They do claim to reserve the right to take exception to any findings which the Board makes.

[10] The Board would like to note that the failure to propose proper findings and conclusions has greatly complicated the task of the Board and has made it virtually impossible in some instances to know whether particular issues are in fact contested.

of proposed findings and at the same time reserve the right to attack the Board's decision once made. We have concluded that the best course would be the following: We will treat as contested issues of fact those as to which intervenors introduced affirmative evidence or engaged in substantial cross examination. With respect to conclusions of law, we will attempt to deal with those questions which we understand to be raised by the proposed conclusions in the light of earlier contentions by the intervenors. We leave open the question of the effect of the failure to file adequate Proposed Findings and Conclusions for consideration when and if there are exceptions to our decision.

II. Radiological Health and Safety

10. The proposed reactors are of the pressurized water type, each with an ultimate power level of 2252 MWT. One of the reactors will be used solely for the production of electrical power (800 MWe); the other will produce approximately 500 MWe of electrical power and, in addition, supply steam for use in various manufacturing processes.

11. Applicant's proposed findings on radiological issues cover approximately 100 pages (out of a total of 267). While the Board has found these very detailed proposals helpful, it does not feel that it should respond in kind. The proposed reactors are substantially identical to a number of reactors previously licensed. The Board has reviewed the various aspects of the proposal, *e.g.*, coolant systems, leak detection systems, seismic design criteria, instrumentation, radiation monitoring, control room, flooding,[11] and finds that Applicant has submitted sufficient information and the Staff has conducted an adequate review

[11] With respect to flooding, the staff testified that it would review the Applicant's calculation of the probable maximum flooding during construction of the plant to assure that the calculational technique described by Applicant have been properly employed. (Staff Safety Evaluation ("SSE") p. 14)

of those aspects of the Plant. We do not believe it would be helpful, nor is it required that we do so, to comment in any detail on the standard features of the Plant, (except where an issue is contested). Instead we will devote our attention to those aspects of the proposal which are new or unusual, to contested issues, and to those specific matters as to which we are required to make findings.

12. The aspects of the Plant of primary interest stem from the fact that its dual-purpose nature requires that the reactor be located in close proximity to a large chemical plant, a plant which is heavily populated during work hours. The contested radiological issues are: meteorology and the related dose calculations; quality assurance; emergency procedures; and iodine spray removal systems.

13. The Plant site is located on the south shore of the Tittabawassee River in Midland County,[12] Michigan. The site consists of approximately 1200 acres of which a relatively few acres along the river will be utilized for Plant buildings and about 880 acres to the south of the area occupied by the Plant itself will be used for a cooling pond. The site is bounded on the north and east by the Tittabawassee River, on the south by Gordonville Road and on the west by farmland and scattered residences (PSAR Applicant's Ex. 1-A, § 2 and Figure 2-1).

14. Applicant has described the population density and use characteristics in the site environs (PSAR Applicant's Ex. 1-A, § 2.2.5 and 2.2.6). The areas directly across the river from the Plant to the north and east are occupied primarily by the industrial complexes of the Dow and the Dow Corning Company for a radius of one mile to one and one-half miles. The area beyond these industrial complexes to the north is occupied by the commercial and residential

[12] The site is presently in Midland Township; however an Order of annexation of the Township to the City of Midland has been issued and is presently in litigation.

areas of the City of Midland and the area to the east is a sparsely populated residential area containing many forested areas and scattered farms. The area to the south of the Plant is occupied by the cooling pond and other portions of the site for about one mile, is primarily forested for an additional two miles and primarily used for farming for another two miles. The first mile to the east of the Plant is industrial property owned by Applicant and Dow; the next mile is mostly residential and light farming; and the next three miles are sparsely populated and primarily agricultural. The area five to fifty miles from the site is primarily used for farming, where not forested, except for the industrial communities of Bay City, Saginaw and Flint (PSAR Applicant's Ex. 1-A, § 2.2.6). Projections of population growth have been made by Applicant for Midland County and surrounding counties based on material supplied by the Michigan Department of Commerce (PSAR Applicant's Ex. 1-A, § 2.2.5).

15. The required (10 CFR § 100.3(a)) exclusion area for the Plant has a radius of 0.31 miles (500 meters). The land within this area will be owned by Applicant except for a small portion which consists of a fenced-in waste treatment facility owned by Dow. Dow employees visit this facility only occasionally and Dow has agreed that Applicant may exercise the right to remove persons therefrom when required (PSAR Applicant's Ex. 1-A, § 2.2.4; Response to Staff Question 2.8, PSAR Applicant's Ex. 1-C, p. 2.8-1). The Board concludes that Applicant has the authority to "determine all activities" in the calculated exclusion area as required by 10 CFR Part 100.

16. The low population zone proposed by Applicant has a radius of approximately one mile (1600 meters) from the reactors. The area encompasses property owned and controlled by Applicant south of the reactors, a part of the Dow and Dow-Corning Company complexes to the north and east and a few residences in the southwest (PSAR

Applicant's Ex. 1-A § 2.2.5.5). The residential population within this zone is approximately 38 and the transient industrial or business population, primarily employees of Dow and Dow-Corning, is about 2145 (PSAR Applicant's Ex. 1-a, § 2.24; Tr. 3103, 3119, 3295). The residential population within the zone is well within acceptable limits. The size of the transient population is unusually large and the acceptability of the low population zone depends upon the ability to evacuate the Dow and Dow-Corning employees. Subject to what is said below (see Findings 31-33) with respect to evacuation plans, the Board finds the population zone satisfactory.

17. The distance from the reactor to the nearest boundary of the City of Midland is 0.21 miles, considerably less than the "population center distance" of one and one-third miles seemingly required by the Regulations (10 CFR § 100.11(a)(3)). However, in view of the fact that the population within one and one-third miles was largely limited to a transient population and that populous areas of Midland were sufficiently removed from the site vicinity, the Staff concluded that the reduced population distance was acceptable (SSE, p. 9; Tr. 2135-39, 2145, 2165). We concur.[13] The recently ordered annexation of Midland Township by the City of Midland will not affect the population distribution.

18. Applicant is a combination electric and natural gas utility incorporation under the laws of the State of Michigan. The Applicant will finance the total costs of constructing the Midland Plant as an integral part of its normal construction program, using funds internally generated (cash on hand, undistributed earnings and depreciation and other accruals) and from the sale of securities (debt, equity,

[13] Again, the acceptability of the reduced population distance depends on our conclusions as to the feasibility of rapid evacuation of the transient population, discussed at Findings 31-33 below.

and short-term notes) when and as required, in the same general manner as it finances other Plant additions. (PSAR Applicant's Ex. 1-D and 38E; SSE Appendix H, and Staff Ex. 8.)

19. Applicant has had long experience in building and operating fossil fuel plants and has gained experience in nuclear plants at its Big Rock Nuclear Plant and Palisades Plant. The Babcock and Wilcox Company (B&W) which will design and supply the nuclear steam supply system, and the Bechtel Corporation which will design and supply the remainder of the Plant, have had extensive experience in designing and constructing nuclear projects.

20. The application reflects that the activities to be conducted would be within the jurisdiction of the United States and that all of the directors and principal officers of the Applicant's organization are citizens of the United States. Applicant is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. The Applicant will rely upon obtaining fuel as it is needed from sources of supply available for civilian purposes, so that no diversion of special nuclear material needed for military purposes is involved (PSAR Applicant's Ex. 1-D; SSE p. 83, following Tr. 1674).

21. The AEC requires that data as to site meteorology be included in the PSAR for a construction permit. This information is used in evaluating the adequacy of plant site and plant design. The meteorological data are used in calculating the radiation dose which might be received over any given period of time by a person at the site boundary from normal operating or accidental airborne releases. Intervenors questioned the adequacy of the meteorological data with respect to the evaluation of the site under 10 CFR Part 100. In particular, they challenged the assumption as to diffusion rates used in that evaluation.

22. Two main sources of data were used by Applicant: The Dow Plant, which has recorded weather records for over ten years, and the Saginaw (Tri-City) Airport, about eight miles southeast of the site.[14] The Dow data was considered to be too incomplete for purposes of calculating diffusion models, and for that purpose Applicant used the more extensive, but more remote data from Tri-City Airport. (PSAR, Applicant's Ex. 1-A, p. 2A-4). In order to grant a construction permit, the Board is not required to find that the available meteorological data is complete (which it clearly is not). The Staff did not accept Applicant's data, but used, as is its practice, an arbitrary formula incorporating what it claims to be many conservative features. (SSE, p. 10). The Staff witness, an employee of the National Oceanographic and Atmospheric Administration ("NOAA") confirmed the conservatism of the assumptions in light of the general conditions in the area. (Tr. 3704). The testimony of Intervenor's witnesses, although there is some ambivalence, taken as a whole tends to corroborate the conservatism.[15] (Tr. 3406-3687). The Board is satisfied that the assumptions are sufficiently conservative to justify a reasonable expectation that the site is satisfactory.

23. Because of the absence of on-site data, the Applicant indicated it will conduct an on-site meteorology program with a continuous recording of meteorological data (wind direction, velocity and temperature lapse rate) until at least a year's history is obtained. (PSAR, Applicant's Ex. 1-c p. 1.00-1). Since the conclusion of the hearing, the AEC has promulgated Safety Guide No. 23, *Onsite Meteorology Programs*, describing the requirements of an acceptable on-site meteorological program, which is considerably

[14] A third source of some upper air data was U.S. Weather Bureau information from Flint, Michigan, about 50 miles southeast of Midland. (PSAR, Applicant's Ex. 1-A, pp. 2A-3 to 2A-4).

[15] For example, (at Tr. 3659) Dr. Epstein characterized the site as "being rather good from the point of diffusion by and large".

more extensive than that proposed by Applicant in the PSAR. The Board concludes that the Staff should require Applicant to conduct a meteorological program of the scope described in the Safety Guide No. 23. The program must be sufficient to validate the conservatism of the meteorological assumptions referred to above and can be developed and executed during the construction phase.

24. The application states that the reactor vessel, steam generator, and pressurizer will be designed, manufactured and tested in accordance with Section III of the ASME Code. (PSAR, Applicant's Ex. 1-A, § 4.5). Several types of nondestructive tests are to be performed during fabrication of the reactor vessel. These tests include radiography of welds, ultrasonic testing, magnetic particle examination, and dye penetrant testing. (PSAR, Applicant's Ex. 1-A, §§ 4.5.1 and 4.5.2). Surveillance specimens consisting of material representative of the reactor vessels are to be exposed in the reactor vessels to allow monitoring of the neutron induced nil ductility transition temperature shift. (PSAR, Applicant's Ex. 1-A, § 4.2.5.2).

25. The reactor coolant piping is to conform to the nuclear power piping code, USASI B31.7, and the reactor coolant pump castings are to be manufactured in accordance with Section III of the ASME Code, where applicable. (PSAR, Applicant's Ex. 1-A, § 4.5). All system components are to be designed to withstand normal loads of mechanical, hydraulic and thermal origin plus the forces that would result from the blowdown of the reactor coolant system as a result of a design basis loss-of-coolant accident, concurrent with the design basis earthquake loads. (PSAR, Applicant's Ex. 1-A, Appendix 5A). The proposed codes and standards for reactor coolant system components and piping comply with 10 CFR § 50.55a. The Staff has reviewed the codes, the plans for design and fabrication, and the quality specified for the reactor vessels and coolant piping

and concluded that the reactor vessels and coolant piping as planned are acceptable. (SSE, p. 20).

26. Finally, the quality assurance program calls for verification by the Applicant of the methods used by the vendor to certify that this equipment meets the specifications developed on the above bases. (SSE, p. 22).

27. The Staff and their consultants have reviewed and found the seismic design methods acceptable. Major core and core support components will be designed to provide assurance that they are not vulnerable to vibration. Confirmatory vibration testing will be conducted as part of the preoperational start-up program. The Staff has found acceptable the Applicant's plans and methods for limiting the vibration of the internal components. (SSE, p. 22; SSE, Appendix G).

28. A great deal of the discussion with respect to Quality Assurance by the Intervenors reflected a basic misunderstanding of the Board's function in this area at the construction permit stage. That function is to ascertain whether the Applicant has adopted a *program* of quality assurance, over which it will have final responsibility, and which, if implemented in accordance with the representations of the application, will satisfy the requirements of Appendix B of 10 CFR Part 50. The enforcement of the program is the responsibility of the Commission which has delegated the enforcement function to the Director of Regulation. The Board must assume that the Director of Regulation, through the Directorate of Regulatory Operations will require adherence to the quality assurance programs described in the application.

29. The record in this proceeding shows that Applicant is committed to a comprehensive, documented quality assurance program for which it will have final responsibility. The application contains a description of the program, including a discussion of how the applicable requirements of Appendix B of 10 CFR Part 50 will be satisfied. The Board has reviewed this information and concluded that if the program is implemented in accordance with the representation in the application, the requirements of Appendix B will in fact be satisfied. During the hearing, much additional information relating to the question of quality assurance was introduced into the record (Tr. 4009 et seq.). For example, the record includes manuals implementing the quality assurance program; Division of Compliance (now Directorate of Regulatory Operations) reports, noting, *inter alia,* some deficiencies in the Applicant's implementation of the program; and documentation relating to what the Saginaw Intervenors allege was inadequate quality assurance during the construction of the Applicant's Palisades Plant. The Board has considered this additional information, but only for the limited purpose of determining whether any evidence has been adduced which would be inconsistent with findings favorable to the Applicant on the ultimate issues in the proceeding. The Board has found no such evidence in the record.

30. A major objection of Mapleton Intervenors is that fabrication of the reactor vessels for this plant had been commenced and one of the vessels was approximately 50% complete at the time of the radiological hearing, and that the AEC's Division of Compliance had not yet inspected the reactor vessel nor made audits of the fabricator's documentation. There is nothing in the Regulations or in sound practice which prohibits the beginning of fabrication of the pressure vessel before the construction permit is granted. Nor is there any requirement that the Division of Compliance inspect the vessel during fabrication. A witness from the Division of Compliance described generally the steps involved in reactor vessel fabrication, the documentation accompanying each step and the testing of the reactor vessel at the end of fabrication (Tr. 4539-41). At the end of this procedure the Division of Compliance will audit

the documentation and make a physical inspection of the vessels (Tr. 4541, 4568-69). Any deficiencies will be brought to the attention of Applicant and it will be required to correct them (Tr. 4569).

31. Applicant submitted an emergency plan prescribing immediate action to be taken to minimize exposure of persons to radiation, both within the exclusion area and outside the exclusion area from any major accidental release of radioactivity. The emergency plan prescribed the actions to be taken in order of priority, the responsibilities of Plant personnel and summarized the personnel and materials available for assistance. The emergency plan took into account evacuation of the Dow Chemical and Dow-Corning plants in the event of a large accident and gave consideration to procedures in the event of an accident at Dow Chemical that could affect the Plant. (PSAR, Applicant's Ex. 1-A. Appendix 2C-1 through 2C-20).

32. Testimony at the hearing indicated that Applicant had prepared the plan prior to issuance of the AEC's "Guide to the Preparation of Emergency Plans for Production and Utilization Facilities" in early 1970, and prior to promulgation of Appendix E to 10 CFR Part 50. (Tr. 2243). Despite its acceptability to the Staff, the Board found this original plan inadequate, and so advised Applicant at the hearing. (Tr. 2258, 2271). Applicant thereupon revised its emergency plan based on its Palisades Plant operating license stage emergency plan and on more detailed contact with local agencies. (Tr. 2604-2615). The revised plan contains and incorporates the State of Michigan emergency plan, the Midland County Civil Defense Plan and Dow Chemical evacuation procedures. Appendix E to 10 CFR Part 50 requires the Applicant to include in the PSAR a "discussion of preliminary plans for coping with emergencies." The discussion is to include "sufficient information to assure the compatibility of proposed emergency plans" with the plant location. The purpose of this

requirement as we understand it is not to insist on specific proposals, but to give enough general information to indicate that a satisfactory plan is feasible.

33. In view of the "credit" taken by the Applicant in establishing the population center distance and the relatively high number of transients in the low population zone, the Board was particularly interested in the evacuation procedures of Dow and Dow-Corning. Considerable testimony on the Dow procedures was adduced at the hearing. (Tr. 2664-2683; 3047-3266). Notwithstanding the testimony of Saginaw Intervenors' witness (Tr. 4695-4821), based on experience elsewhere in uncontrolled situations, the Board is satisfied that timely evacuation is reasonably assured. However, the Board agrees with the Staff's view that advance planning should be done to protect the population in the low population zone and that such plans should be capable of expansion and mobilization of extra resources should a more serious accident occur. The Board is satisfied that the revised plan conforms with the requirements of Appendix E to 10 CFR 50.

34. The reactor building spray system is provided to remove heat and fission products from the reactor building atmosphere following a loss-of-coolant accident in order to limit the reactor building pressure to the design value and to reduce the post-accident level of fission products in the reactor building atmosphere. Chemicals are added to the water coming from the borated water storage tank after a loss-of-coolant accident to establish a basic pH by addition of sodium hydroxide and to provide for iodine retention by addition of sodium thiosulfate. (PSAR, Applicant's Ex. 1-A, § 6.2). The major question raised was as to the long-term stability of the sodium thiosulfate. In the Board's view, Applicant's testimony at the hearing confirmed the long-term stability of sodium thiosulfate solutions (Tr. 2836-55).

35. Electric power generated by the Plant is to be fed through separate connections to a main transformer for each unit. There, it is stepped up to 345 kV and delivered to a switchyard on separate overhead lines. The units and associated switchyard will be part of the Applicant's integrated elctric system. The Plant elctrical output also feeds the Plant station power transformers. The five 345 kV transmission lines which terminate at the Midland switchyard will provide startup and standby power from the system through a step-down substation (to change the voltage from 345 kV) and a Plant start-up transformer. A second Plant start-up transformer will provide an alternate off-site power source via another 138 kV substation. (PSAR, Applicant's Ex. 1-B, §§ 8.2.1; p. 8.2-2; SSE, pp. 41-42). The Plant has an auxiliary power distribution system which is a two-bus system for each unit. The engineered safeguards system bus sections are electrically separate and redundant and will be located in separate rooms of the auxiliary building to provide physical isolation. The redundant safeguard bus sections will have access to (a) the Plant electrical output through the station power transformers, (b) the off-site area transmission network, and (c) the onsite emergency diesel generators. (PSAR, Applicant's Ex. 1-B, § 8.2.2, SSE, pp. 42-43). The Plant's direct current power supply for safeguards systems consists of two 125-volt batteries located in separate rooms. Two separate 125-volt d-c power distribution buses will be provided to supply redundant safety related loads in each unit. These batteries will have the capacity to provide a safe and orderly hot shutdown in the event that all a-c power is lost. Separate 250-volt batteries will supply non-safety related loads on site. (SSE, p. 44-45).

36. The Saginaw Intervenors questioned whether there was sufficient redundancy and electrical independence in order to assure that electrical power would always be available to operate required safeguards equipment. Applicant's

testimony was that the design criteria for the two-unit Plant are satisfied by the two shared diesel generators and that their ability to perform their safety functions is not significantly impaired by such sharing. (Tr. 2330-2340).

37. The Board asked Applicant to indicate the experience of other industries with emergency generation and their redundancy requirements. (Tr. 2920-21). Applicant testified that no industry, except the nuclear industry, requires redundant emergency power sources although some airports have redundant systems. The absence of such a requirement appears to be based on the satisfactory performance of emergency power systems over the past twenty years. (Testimony of Witness Castleberry, filed August 16, 1971.)

38. The Staff has found the electrical system, including the backup diesel system adequate; however the Staff has required that test data be supplied to confirm the suitability of the diesel generators as an on-site emergency power source prior to the operating license review (SSE, p. 43).[18] We concur.

III. Emergency Core Cooling System (ECCS)

39. The sufficiency of the ECCS was contested by Intervenors from the outset of the proceedings and would, in the normal course of events, have been one of the radiological issues litigated in June and July 1971. On June 29, 1971, the AEC issued new rules governing ECCS in the form of "Interim Criteria for Emergency Core Cooling Systems for Light-Water Power Reactors" (36 *F.R.* 12247); the Criteria were amended on December 18, 1971 (36 *F.R.* 24082) to cover B & W reactors. In the meantime the AEC had on November 30, 1971 (36 *F.R.* 27774) pub-

[18] The Staff has also indicated that more detailed cable installation and additional design criteria will be required (SSE, p. 45).

lished a Notice of Rule Making Hearing on ECCS.[17] Both Mapleton and Saginaw Intervenors are parties to that hearing.

40. Intervenors do not contest the compliance of the proposed reactor with the Interim Criteria. The Staff has found that the proposed reactors do meet the criteria and the Board finds the Staff review adequate.

41. Intervenors do, however, challenge the validity of the criteria. Normally such a challenge would be made (under the Calvert Cliffs doctrine) by attempting to establish a sufficient case of invalidity to warrant the Board's referral to the Commission. Here, as the Board has pointed out in its Order of March 10, 1972, the usual practice would make no sense. The AEC has the issue before it; it is being vigorously litigated in the national ECCS hearing (Docket No. RM-50-1) and nothing but confusion would be added by our consideration of the issue here.[18]

42. We believe that this mode of proceeding is mandated by the AEC instruction that the pendency of the rule-making hearing should not affect the orderly resolution of the ECCS issue in licensing proceedings (37 *F.R.* 288). We also are of the view that no problems of public health and safety are created by so proceeding. Applicant will be bound to comply with any changes in criteria which may be adopted as a result of the national hearing. In any event, Applicant has committed itself to meeting any applicable ECCS regulation forthcoming from the proceeding and has furnished the Board with a compilation of dates by which major components involved in ECCS analysis are

---

[17] The Interim Acceptance Criteria were promulgated without a rule-making hearing.

[18] Our conclusion is consistent with that of the Atomic Safety and Licensing Appeal Board in *Wisconsin Electric Power Company et al.* (Point Beach Nuclear Plant, Unit 2), ALAB-78 (November 10, 1972), at pp. 517-539 in WASH-1218(Suppl. 1).

needed at the site in order to meet a schedule of commercial operation in May 1977 (Applicant's letter of June 6, 1972). This schedule indicates that no major components involved in the ECCS analysis are needed at the site prior to the spring of 1974. Applicant in furnishing the list also agreed that unless the ECCS rulemaking had been completed earlier, none of those major components would be shipped prior to the date needed on site without prior AEC approval (Applicant's letter of June 6, 1972). Thus, if any modification in equipment is necessary, the equipment will still be in the shop where it can be more readily modified than if it had been shipped or installed.

IV. Environmental Issues

43. With respect to environmental questions the Board is required to do the following: (a) determine whether the requirements of the National Environmental Policy Act and Appendix D to Part 50 have been complied with, (b) independently consider the final balance among conflicting environmental factors in the record of the proceeding, (c) determine after weighing the environmental, economic, technical and other benefits against environmental costs whether the permit should be issued, denied, or appropriately conditioned, (d) (in a contested proceeding) decide any matters in controversy among the parties. By its Order to March 10, 1972, the Board ruled that it would not consider the environmental effects of the fuel cycle except in the following aspects: (1) the transportation of fuel elements from the fuel fabrication plant to the reactor site, (2) the transportation of spent fuel elements from the site to the fuel reprocessing plant, (3) the transportation of packaged radioactive material from the site to low-level waste burial grounds, and (4) radioactive discharges occurring at the site and any other environmental effects directly associated with the handling and use of the nuclear fuel at the site. That decision of the Board was upheld by the

Atomic Safety and Licensing Appeal Board. In reaching our decision we do not mean to suggest that there are no environmental costs associated with mining, fabrication and waste disposal. But we are not engaged here with an assessment of the entire atomic energy program and there is no meaningful way—except the cost of fuel—that we can assess those costs in this proceeding.

44. Environmental issues are a new area of responsibility for the Atomic Safety and Licensing Boards; as yet there are no precedents to guide the Boards and the regulations are vague as to how the environmental decision is to be made. In the hope that it will be helpful to Boards in other cases, we have attempted to describe in some detail how we have gone about deciding environmental issues. In the process we have treated some issues in more detail than is warranted by the evidence adduced in the hearing.

45. The difficulty lies in the direction to the Boards to independently consider the final balance after weighing the costs and benefits. "Final balance" and "weighing" costs against benefits have a deceptively mechanistic connotation, as though one could make a calculation of the costs and benefits and decide on the basis of the arithmetic. Obviously this is not possible. Calculations of costs and benefits may be a useful exercise, but more often than not the qualifications are so speculative and non-objective as to be worse than useless.

46. The chief benefits claimed by Applicant and the Staff are the production of electricity (and process steam) and the elimination of the air pollution from Dow's present fossil-fuel steam plant. The claim of production of electricity as a benefit is in turn premised on the need for additional electricity on Applicant's system. The demonstration of that need took the conventional format.

47. Applicant presented detailed electric sales forecasts through 1980, converted sales forecasts into estimates

of peak demand for electricity and related the projections to its existing generating capacity, its construction and retirement program and projections for the Michigan Electric Power Pool to demonstrate the need for electricity from the Plant. (ASER Applicant's Ex. 38F-1, Section 2; Applicant's Ex. 38G, revised Ex. 1 to Section 2; Applicant's Ex. 38K, pp. 108-114.) The projected increases in sales over the next ten years result from population increases, particularly large increases in the adult population which result in increased household formation, and increased usage per consuming unit, including significant increase in electricity being used for control or elimination of air and water pollution (ASER Applicant's Ex. 38F-1, pp. 2-6 to 2-9; Tr. 6528-33). The Staff has concluded that the projections of need are reasonable, and a witness from the Federal Power Commission (FPC) agreed (Tr. 8090-91). Intervenors do not seriously challenge the projections, although Mapleton made a weak try at eliciting a concession that the additional capacity was really to satisfy Canada's needs rather than local needs. We find that this "contention" is without foundation, and we conclude that Applicant's projections of need are reasonable. (ASER Applicant's Ex. 38G, Table DEM-1 to revised Ex. 1 to Section 2; Applicant's Ex. 38K, pp. 109, 111.)

48. Intervenors have suggested at various times that the Board must go behind the characterization of "demand" made by the Applicant to determine whether an appropriate alternative to satisfying the demand would be to set limits on particular uses of electricity. The Board declines to do so. So far as appears from the record, the postulated demand is made up of normal industrial and residential use and it is, in our view, beyond our province to inquire into whether the customary uses being made of electricity in our society are "proper" or "improper". The suggestion was also made that Applicant is stimulating demand by its advertising. No evidence was offered on this

point and absent some evidence that Applicant is creating abnormal demand, the Board did not consider the question.

49. Once the Board accepts the need and the "benefit" of satisfying that need, its conclusions on the cost benefit questions (although not as to alternatives) is, in our view, practically a foregone conclusion. It would require some evidence of special environmental damage to outweigh the benefit and there is no suggestion of such special damage in the record. Indeed if such evidence existed, it would probably be relevant to the question of alternatives rather than cost-benefit.

50. Nevertheless, we believe it would be instructive to review in some detail the subject of the cost of the damage to terrestrial ecology at the site. The evidence on this point was a substantial portion of Mapleton Intervenors affirmative case and the subject illustrates very well the nature of some of the problems posed for all concerned by the requirement that the costs and benefits be weighed and a balance struck.

51. As noted earlier, the site is adjacent to a large industrial complex and some residential property. There is nothing unique about it,[19] and in all likelihood, if not used for the proposed plant, it will be used for some other industrial, or possibly residential, development. Applicant's assessment of the impact of the plant on the terrestrial ecology is based on a survey performed by a team under the general supervision of Dr. Leslie Gysel of Michigan State University.[20] (ASER, following p. 3-1.) Applicant

[19] The Board visited the site and saw nothing to contradict Applicant's evidence as to the absence of unique characteristics.

[20] After the close of the hearing, Applicant offered a written statement of Dr. Gysel in reply to the testimony of Mapleton's witness Dr. Stuart Holcomb. Mapleton objected to the reception of Dr. Gysel's statement, and, asked that if it were to be received in evidence, the Board also consider a supplemental statement by Dr.

concededly did not attempt to identify every species of plant or animal at the site or to make detailed population estimates. Instead, it listed those wildlife species that had been personally observed at the site, those for which signs such as scat, tracks, etc. had been observed by local residents and plant site security personnel. The result of the survey is the conclusion that there are no special characteristics of the site of special value as a wildlife habitat.

52. Intervenors on the other hand challenge the survey as completely inadequate and assign a "conservative" value of $36,000,000 to the flora and fauna to be disturbed by construction. Approximately $30,000,000 of this amount is for losses of bird life and animal life alone. (Tr. 8563.) The method used to arrive at these evaluations was to estimate populations of species which would be expected to be found in the area on the basis of existing studies. Intervenors then estimated the number of each species expected to be found and assigned an arbitrary value to each bird and animal, for example, $10.00 per sparrow and $10.00 per mouse. Intervenors' witness, Dr. Stuart Holcomb, made no allowance for the effect of predation, although he conceded that predation would take a considerable toll. (Tr. 8592, 8596.) Nor did he make any allowance for the fact that many of the birds to be found are generally considered pests (indeed there are bounties in the State of Michigan on some of them). He then multiplied his final figure by 30 representing the expected life of the plant of 30 years. The Board finds this method of evaluation and calculation wholly insupportable. We note without further comment, for example, that the figures shown include $151,000 per year as the value of mice to be lost and

Holcomb. Both statements are essentially argumentative and no purpose would be served by re-opening the hearing to allow cross-examination. The Board understands the arguments of both sides, and for reasons which should be clear from the text is of the view that no further evidence would be useful.

$190,000 per year for varieties of sparrows—a total of some $10,000,000 over the life of the plant for mice and sparrows alone.

53. The testimony does however illustrate that a more elaborate survey of ecological effects on the plant site could have been made. The real question is at what expense and to what end. We agree with Dr. Gysel that a complete survey would be very expensive and, for some species, not even possible. We are not insensitive to the problems posed, but we believe that it is only realistic to accept the cost of the land as the cost of the ecological impact on the site, at least absent a showing of some special characteristics as to particular species or value of the tract of land as a habitat for wildlife. But even if we were to accept Dr. Holcomb's premise, and his arithmetic, the result would be no different. Given our prevailing values there is no way in which the loss of flora and fauna in a site of this kind can outweigh the benefits of supplying needed electricity.

54. Are the other disbenefits claimed by Intervenors substantial in comparison to the need for electricity? Those stressed by Intervenors include the threat of process steam contamination; the impact on aquatic ecology; the effect of releases of radioactivity during normal operation; the claimed "synergistic" interaction of releases of radioactivity with chemicals released from Dow; the effect of accidents; fogging and icing from the cooling pond; and the effect of decommissioning.

55. To the extent that the claimed disbenefits are based on releases of radioactivity within the limits permitted by the regulations, these contentions of Intervenors were treated during the radiological hearings as attacks on the regulations. Under the prevailing practice, such attacks can only be considered by the Boards for the purpose of ascertaining whether a sufficient showing of invalidity has been made to warrant referral to the Commission. For those

purposes, the showing was, in all cases, clearly insufficient. However, in the environmental hearing, the Board permitted testimony and cross-examination on such matters as pertinent to the cost-benefit analysis.

56. As originally proposed, the process steam supplied to Dow would have been produced via secondary heat exchangers. At an early stage, Applicant modified the proposal to provide a tertiary heat exchanger—further insulating the process steam from the possibility of introduction of radiation from the primary coolant. The process steam will be monitored for radioactivity with an on-line gross gamma monitoring system and with grab samples for gross beta. The tertiary steam to Dow will not contain more radioactivity than the Lake Huron makeup water supplied to the tertiary heat exchangers. (PSAR Applicant's Ex. 1-c, p. 11.00-2.) If any Dow products exceeds the inherent natural background radioactivity, the product will be decontaminated or disposed of as necessary. (Applicant's Ex. 38c.)

57. The Board finds that the system promises to provide assurance that leakage of radioactivity into the process steam will be an extremely remote possibility; that Applicant has submitted sufficient information; and Staff has performed an adequate review with respect to process steam monitoring. The environmental effects of the process will be insubstantial.

58. The liquid waste treatment system is designed to collect, process and reuse or dispose of off-site all liquid waste, except for laundry waste, containing radionuclides generated during normal operation of the Plant. (PSAR Applicant's Ex. 1-B, Section 11.) About 120 gallons per day will be the only waste containing radionuclides from the Plant that will be released to the Tittabawassee River during normal operation. The Applicant estimates that the gross activity in the dilution stream from this laundry

waste, based on operation with 1% failed fuel for a full year will not exceed 25 pico curies per liter on an annual average, i.e., equivalent to about two curies per year. (PSAR Applicant's Ex. 38-E, p. 11.1-1.) Using this upper limit concentration, the Applicant calculates a potential dose to a hypothetical individual who consumes 2200 cc's per day of water from the river and eats 37 lb of fish per year from the river to be about 0.8 mrem/year. (PSAR Applicant's Ex. 38-E, p. 11.8-11.)

59. Potentially high-activity waste-gas is routed to the waste-gas surge tank where its activity is monitored. In the event of high levels of radioactivity, the waste-gas is routed to waste-gas decay tanks where such gases can be stored for up to sixty days to permit decay of all of the radioactive gases, other than krypton 85, to essentially zero. (PSAR Applicant's Ex. 1-B, p. 11-7; ASER, p. 4.2-4A.)

60. Applicant estimated that in the event both reactors operate for a full year with 0.1% failed fuel, the quantity of Kr-85 and Xe-133 released through the radwaste treatment system will be about 1224 curies and 50 curies, respectively. The applicant further calculated the dose to an individual continuously present at the site boundary for a full year to be about 0.46 mrem/year. (ASER Applicant's Ex. 38F-1, Section 4.2.) A calculation of the dose using 60 days' holdup and 1% failed fuel would be approximately 4.6 mrem/year. This dose is a small fraction of 10 CFR Part 20 and is less than the dose specified in the proposed Appendix I to 10 CFR Part 50.

61. The solid waste treatment system consists of tankage and facilities for collecting and packaging spent demineralizer resins and evaporator bottoms and for packaging contaminated items such as spent filter elements, rags, clothing, etc. All radioactive material from the solid waste system will be shipped off-site for storage by AEC licensed contractors. (PSAR Applicant's Ex. 1-B, p. 11-8.)

In the Board's view, the environmental effects of the normal releases of radioactivity and disposal of solid wastes are minimal.

62. While no aquatic environmental studies have been conducted by Applicant or the Staff, there have been numerous studies conducted by the Michigan Water Resources Commission, Michigan Department of Natural Resources and by Dow over the years. (ASER Applicant's Ex. 38F-1, Section 3.2.2.)

63. The Michigan Water Resources Commission is implementing a program to improve discharges into the river and improve river water quality. The Tittabawassee River from Midland to its confluence with the Saginaw River is designated to be upgraded not later than January 1, 1974, for intolerant fish warmwater species and agricultural uses. (Tr. 5664-65.) Applicant will be required to conduct a thorough ecological study of the site and its environs prior to Plant operation to establish base line values as recommended by the Staff. Applicant has committed itself to discharges that are significantly lower than those permitted by the standards for thermal releases and total dissolved solids. The Board accepts the conclusion that the proposed use of Lake Huron water by the Plant will not create any incremental environmental effects. However, there will be some destruction of aquatic life in intake water from the Tittabawassee River. Because of the presently depressed quality of the river, the amount to be destroyed is conjectural,[21] but even after the river is improved, the aquatic life destroyed should not be significant.

---

[21] Applicant submitted only a preliminary design of the intake structure for taking water from the river to the pond, pending the results of a study which it agreed to undertake as to the type and size of fish to be expected in the river after upgrading. The Board understands that the final design will incorporate the Staff's recommendation that the intake flow velocity should be less than one foot per second. (See Finding No. 77.)

64. Intervenors alleged that because of the unique location of the Plant adjacent to a large chemical complex, the effects of radioactive effluents from the Plant might combine synergistically with the effect of chemical effluents to produce a combined effect greater than the sum of the separate effects. The synergistic effects considered included both the physiological effect of combined dosages of the chemical and radiological effluents on the tissue of human recipients and the interaction of the radiological and chemical effluents in the environment to produce a reactant which could have a different effect on the human recipient.

65. Saginaw Intervenors requested a list of all chemical effluents discharged to both the air and water from the Dow complex. (Tr. 1500.) The Board ordered Dow to submit a list of effluents expected to be discharged from its facilities in 1975, the year in which the Plant was originally scheduled to start operation. (Tr. 1502.)

66. Although repeatedly invited to submit evidence in support of their claims of synergism, Saginaw Intervenors never did so. However, at the environmental hearing, Mapleton did produce three witnesses on the subject: [22] Dr. Richard Meierotto (Tr. 8248-8291), Dr. Carl Nordahl (Tr. 8487-8517) and Dr. Ernest Sternglass (Tr. 8360-8487).[23]

---

[22] Technically, the evidence of synergism at the environmental hearing was admissible only as to the cost-benefit analysis. However, with respect to synergism, as indeed with respect to other safety questions, the Board was always receptive to any *affirmative* showing by Intervenors.

[23] After the close of the hearing, counsel for Mapleton requested (letter of June 21, 1972) that a letter written by Professor Morris H. DeGroot, which was referred to by Dr. Sternglass, be admitted as evidence of the belief of Dr. DeGroot that there is substantial probability that Dr. Sternglass' hypothesis correlating radioactive discharges with infant mortality is correct. Since Dr. Sternglass remarks on infant mortality were not relevant to synergism—about which he was supposed to be testifying—admission of the letter would serve no relevant purpose.

Viewed in the light most favorable to Intervenors, and without considering the countervailing evidence of Applicant and the Staff, the evidence fails to establish that, at the levels of concentration involved here, there will be any interaction which would tend to increase radiation effects from the Plant, or the chemical effects from Dow. And when one considers the testimony of Applicant and Staff witnesses, the evidence is overwhelming against a finding of "synergism".

67. Applicant furnished information with respect to potential public exposures to radioactivity from postulated accidents in the course of Plant operation. (ASER Applicant's Ex. 38F-1, as amended by Ex. 38G, Section 4.2.2.) The information submitted was in accord with guidance issued generally to Applicants by the Commission on September 1, 1971. The classes of accidents range from those that can be expected to occur during the life of the Plant and have trivial consequences to those that are never expected to occur but could have more severe consequences. However, those accidents with more severe consequences have a probability of occurrence so small that their environmental risk is extremely low. We will discuss the question of accidents again in connection with alternatives, but for purposes of the cost-benefit analysis, we find the cost to be minimal.

68. Mapleton Intervenors raised questions concerning the environmental costs of decommissioning the Plant at the end of its useful life. Neither Applicant nor its contractor has had any experience with decommissioning a nuclear plant. (Tr. 6893.) The AEC has had some experience although not with a plant of the proposed size. The Board is satisfied that decommissioning is possible. The environmental effects of the most likely (given today's technology) method of decommissioning do not appear substantial except for the loss of use of a few acres of land occupied by sealed buildings. The estimates of cost of de-

commissioning are quite speculative; however, the Board accepts as generally indicative of those costs Applicant's estimate of $35,000,000—present discounted worth $8,000,000 (Tr. 7820-21).

69. Mapleton Intervenors also contended that there would be substantial fogging and icing in the area around the cooling pond (including Mapleton). The evidence even of Mapleton's own witness does not support the contention. (Tr. 8317, 8322.) The effect on Mapleton seems likely to be negligible and even in the area close to the pond, the effects seem likely to be insubstantial and the environmental costs minimal. The evidence does, however, demonstrate the need for further study of the effects of cooling ponds and part of the surveillance program of Applicant (see Finding No. 77) should include a study of the duration, intensity and extent of fog and icing in the surrounding area.

70. As noted above, the Board is satisfied that the benefits outweigh the costs. The real question comes with respect to alternatives. Assuming that the power needs are to be met, are there better alternatives? The evidence demonstrates that there are no hydro sites available, that a pumped storage facility would not meet the load needs, that gas is not a viable alternative for power use, and that outside sources are unavailable. (ASER Applicant's Ex. 38F-1, Section 5.2.) The question of alternatives is then boiled down to a choice between nuclear and fossil (either oil or coal) fuel at the proposed location or at some other location.

71. So far as the choice between nuclear and fossil plants is concerned, the evidence demonstrates a considerable cost advantage of nuclear fuel over oil or coal. (ASER Applicant's Ex. 38F-1, Tr. 7011-42, 7917-23.) While long run cost estimates must be speculative, the Board is of the view that they are reasonable, and no contrary estimates were introduced.[24] But large as the estimated cost differentials are, they would not override any significant environmental advantages of a fossil fuel plant in this case. Are there such? The Board finds that there are not.

[24] The cost advantage probably reflects the relative scarcity of low sulphur coal and oil compared to uranium, so that the choice of nuclear fuel is also consistent with the objective of preserving scarce raw materials. However, the Board does not feel that the impact of a single plant on fuel reserves is sufficient to warrant a choice on that basis.

72. The major environmental effects of fossil fuel plants are the release to the atmosphere of fly ash and sulphur dioxide. By contrast, such air pollution from nuclear plants is essentially nil. Light-water moderated nuclear plants are less thermally efficient than fossil plants and discharge more waste heat in the cooling water. However, the use of a cooling pond or cooling tower will minimize the problem so that in the case of the proposed plant, the comparative disadvantage will be an increase in fogging and icing.

73. The major environmental effects from the nuclear plant are from releases of radioactivity in normal operation and from the possibility of accidents. The permissible releases of radioactivity in normal operation are now governed by Part 20 of the AEC regulations. The expected releases from this plant do not exceed Part 20 limits. However, under the regulations, we must take into account the enviornmental impact of radiation releases even within the standards. There are no known effects of radiation in the amounts contemplated to be released from this plant in normal operation, although it is assumed that there are genetic effects and that there may be cumulative effects of a combination of this radiation with other radiation. Weighed by a reasonable scale, these potential costs cannot tip the balance against nuclear power here. The major argument of intervenors is that not enough is known about the long-term effects of small doses and that the plant should not be licensed until such effects are known. This

really is an argument that no nuclear plants should be constructed until we know all that there is to know about low level radiation effects. Such an argument is untenable in light of the Atomic Energy Act. The judgment has been made there that atomic energy must be used for production of electricity and there is nothing in the National Environmental Policy Act which overrides that judgment.

74. Apart from questions of cost, the choice essentially narrows down to weighing the known environmental effects of fossil plants against the possibility of nuclear accidents,[25] indeed, against the possibility of a serious accident not contained within the reactor building. It is widely conceded that the possibility of such an accident is extremely remote. In our view so far as any particular reactor is concerned, the chances of a serious accident involving damage to the public is vanishingly small. This is not to say that such accidents will certainly never happen, but only that the odds of an accident happening at a particular reactor are incalculably small. For purposes of a cost-benefit analysis, we believe they must be taken as insubstantial.

75. Given the already substantial problem of air pollution in the Midland area, we conclude that nuclear power is clearly preferable to available alternatives.

76. Turning to the question of alternative sites, an important feature of the proposed project is its dual-purpose nature. In addition to supplying electricity for the Applicant's system, the plant will produce process steam for use by Dow. Applicant concedes that it would not locate the proposed installation at the proposed site but for this feature. It is thus necessary to consider as an alternative the location of the plant elsewhere and the independent

[25] The Board does not regard decommissioning as a substantial environmental problem; however, as noted above, it may be a significant cost factor.

supply of steam to Dow by some other source.[26] We have not considered, and we do not believe it is within our province to do so, the possibility that there might be environmental benefits from closing down some or all of Dow's operations. If the plant is not built where it is now planned, Dow will have to continue to produce its own steam. Since a small nuclear plant for that purpose would be extremely uneconomical (and would pose most of the same problems as the proposed reactor) as a practical matter, the result would be construction of a new fossil plant. Thus, any other site would have to demonstrate sufficient advantage over the proposed site to outweigh the air pollution from the new Dow fossil steam generating plant. Applicant had adduced considerable evidence that other sites available to it would not have any such advantage and no one else has suggested an alternative site for consideration. We conclude then that there is no preferable alternative.

77. Assuming that the proposed plant will be built at the proposed site, a final question is whether there is a preferable alternative cooling system for condenser water. An important consideration in this respect is that in order to supply coolant water in periods of low river flow, there will have to be a pond built at the location. The use of this pond for cooling thus has a natural cost advantage over cooling towers, all the cost of which would be supplemental to the cost of the pond. (FES, XI-2, 3). The Applicant discussed and the Staff considered the use of both dry and wet cooling towers. Neither form of wet tower (mechanical draft or natural draft) would offer any significant environmental advantages. The use of a dry tower would in the Staff's view eliminate fogging and icing and reduce water consumption, but these benefits would only be achieved at considerable cost in thermal efficiency as

[26] The evidence is clear that it is not economically feasible to supply steam to Dow from a plant at some other remote location. (Tr. 6857-6860.)

well as high capital costs. (FES, XI-37.) Those costs seem hardly justified to avoid the relatively small problem of fogging and icing expected—particularly in view of the lack of experience with dry cooling towers. We find that in the circumstances of this plant; the proposed cooling system is preferable to available alternatives.

78. The Staff's conclusion that the construction permit should be granted was subject to certain conditions. These conditions, which are set forth in Paragraph 7 of the Staff's Final Environmental Statement (FES), included a modification of the water intake design to minimize fish loss, the relocation of certain transmission lines, the conduct of ecological studies and development of surveillance programs, etc. Applicant has agreed to all of these recommendations except that in 7(f) of the FES which would have required Applicant to "prevent any discharge which would result in increasing the phosphorus concentrations in the river above 0.05 ppm". As a substitute for 7(f), Applicant has agreed to treat phosphates so that total discharge including laundry waste and start up waste based on the actual average will not exceed 35 pounds per day exclusive of the pond reconcentration of existing phosphate levels in the river. The Staff agreed to that substitution and the Board sees no reason why the proposal should not be satisfactory. The Board would like to note for the record that its conclusions are based on the understanding the Applicant will carry out the recommendations to which it has agreed.

79. The Board has reviewed the entire record of this proceeding, including the limited appearance statements and the proposed findings of fact and conclusions of law submitted by the parties, and replies thereto submitted by the Applicant. All the proposed findings and conclusions submitted by the parties which are not incorporated directly or inferentially in this Initial Decision are herewith rejected for the reason that there is not reliable, probative,

and substantial evidence in the record to justify their acceptance, or because they are unnecessary to the rendering of this Initial Decision.

V. Conclusions

80. Upon consideration of the record of this proceeding and the findings of fact and conclusions, the Board has determined that:

(1) In accordance with the provisions of 10 CFR 50.35(a):

> (a) The Applicant has described the proposed design of the facility including, but not limited to, the principal architectural and engineering criteria for the design, and has identified the major features or components incorporated therein for the protection of the health and safety of the public;
>
> (b) Such further information as may be required to complete the safety analysis and which can reasonably be left for later consideration, will be supplied in the final safety analysis report;
>
> (c) Safety features or components which require further development have been described and the Board has been assured the Applicant will conduct research and development to satisfactorily resolve any associated safety questions before the latest date stated in the application for completion of construction of the proposed facility.

(2) The proposed facility can be constructed and operated at the proposed location without undue risk to the health and safety of the public;

(3) The Applicant is technically qualified to design and construct the proposed facility;

(4) The Applicant is financially qualified to design and construct the proposed facility;

(5) The issuance of a permit for the construction of the facility will not be inimical to the common defense and security or to the health and safety of the public.

81. Upon consideration of the record of this proceeding and the findings of fact and conclusions, the Board has determined that in accordance with the provisions of Section A.11 of Appendix D, 10 CFR 50:

(1) The requirements of Section 102(2)(C) and (D) of the National Environmental Policy Act and Appendix D of 10 CFR 50 have been complied with in this proceeding;

(2) The appropriate action to be taken is to authorize issuance of the construction permit.

VI. Order

82. Wherefore, pursuant to the Atomic Energy Act as amended, and the Commission's Regulations, IT IS ORDERED that the Director of Regulation is authorized to issue a construction permit to Consumers Power Company. IT IS FURTHER ORDERED, in accordance with Sections 2.760, 2.762, 2.764, 2.785, and 2.786 of the Commission's "Rules of Practice", that this Initial Decision shall be effective immediately upon issuance and shall constitute the final decision of the Commission subject to the review thereof pursuant to the above-cited Rules.

Atomic Safety and Licensing Board

Arthur W. Murphy, *Chairman*

Clark Goodman

David B. Hall

Issued at Washington, D. C.,
this 14th day of December 1972.

ATOMIC ENERGY COMMISSION REPORTS

Volume 6

Opinions and Decisions of the
Atomic Energy Commission
with Selected Orders

January 1, 1973, to December 31, 1973

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

Atomic Safety and Licensing Appeal Board

Alan S. Rosenthal, *Chairman*
Dr. John H. Buck, *Member*
William C. Parler, *Member*

In the Matter of
Consumers Power Company (Midland Plant, Units 1 and 2) — Docket Nos. 50-329, 50-330

Mr. Harold F. Reis, Washington, D.C., for the applicant, Consumers Power Company.

Mr. Myron M. Cherry, Chicago, Illinois, for the Saginaw Intervenors (Saginaw Valley Nuclear Study Group, *et al*)

Mr. Irving Like, Babylon, N.Y., for the Mapleton Intervenors (Nelson Aeschliman, *et al*)

MR. MILTON R. WESSEL, New York, N.Y., for Intervenor, Dow Chemical Company.

MR. DAVID E. KARTALIA, for the AEC Regulatory Staff.

Memorandum and Order

(ALAB-101)

By initial decision dated December 14, 1972, the Atomic Safety and Licensing Board authorized the issuance of a construction permit to Consumers Power Company (the applicant) for the Midland Plant, Units 1 and 2.

Thereafter, on January 7, 1973, the Saginaw Intervenors filed with the Licensing Board a motion, with a supporting affidavit, seeking "to require the presiding officer to recall and revoke the initial decision and to declare the • • • Licensing Board biased." The claim of bias was premised in large part on the views expressed by Arthur W. Murphy, Chairman of the Licensing Board, in an article which he authored and which appeared in the October, 1972 issue of the Columbia Law Review.[1] Because of the asserted bias, the intervenors sought to have a new licensing board appointed, "with instructions to have a new hearing on all relevant issues." By Order dated February 1, 1973, the Licensing Board denied the motion.

On January 15, 1973, after the filing of the motion to recall but before the Licensing Board's denial of that motion, the Saginaw Intervenors filed exceptions to the initial decision. One of these exceptions (VI. B) asserts that the Licensing Board was "personally biased against intervenors" and that it "prejudged contested issues"; the

[1] Arthur W. Murphy, *The National Environmental Policy and the Licensing Process: Environmentalist Magna Carta or Agency Coup de Grace?*, 72 Columbia Law Review 963 (October 1972).

As will appear later, the bias claim was also directed to certain statements made by other members of the Board.

exception cites in particular the same Columbia Law Review article. The intervenors referred to a footnote in their previously filed motion to recall, which had recited their intention to treat the motion as denied if they had not received advice to the contrary by January 15, 1973, the last date on which intervenors could file exceptions to the initial decision; and they take exception to such "denial."[2]

Although the Saginaw Intervenors' motion to recall was not formally designated as a motion for disqualification, within the meaning of 10 CFR § 2.704(c), we regard it as such, despite the question which has been raised concerning the Licensing Board's jurisdiction over that motion.[3] Denial of such a motion by the Licensing Board (assuming it had jurisdiction over the subject matter) operates automatically to refer it to the Commission, and hence to us,

[2] Our consideration of this exception should not be taken as signifying our approval of the manner in which it was presented. The intervenors were not entitled to demand that the Licensing Board act upon the motion to recall prior to the expiration of the time for filing exceptions to the initial decision; nor were they entitled to treat their motion as having been denied if it were not acted upon within that time. Instead, the intervenors need only have (1) filed the motion to recall, unaccompanied by any purported directive to the Licensing Board concerning the timing of its decision on the motion; and (2) if—as occurred—their motion to recall was still pending as the time for filing exceptions approached, included in their exceptions one protecting against the possibility that the motion would be denied.

[3] The applicants argued, both before the Licensing Board and in their motion to us of January 9, 1973, that the Licensing Board did not have jurisdiction, after issuance of the initial decision, to act upon the recall motion. The staff argued that the Licensing Board retained jurisdiction under 10 CFR § 2.717(a), and it recommended that the Board exercise that jurisdiction to "ensure that if the Appeal Board is presented with the question of bias, the Appeal Board would have the full benefit of the ASLB's views on the matter." (Answer of AEC Regulatory Staff to Saginaw Intervenors' Motion, at p. 4.)

for review.[4] Since the issue of alleged bias and prejudgment is before us at least on exceptions to the initial decision, we need not determine the jurisdiction of a licensing board to entertain a motion to recall. In passing upon the claim of bias and prejudgment, we have, however, examined and considered all the documents bearing upon this claim which were filed by the parties.

Those documents reflect that the Saginaw recall motion was supported by the Mapleton Intervenors (who did no more than advise the Board of their support). It was opposed by the applicant, the AEC Regulatory Staff, and Intervenor Dow Chemical Company. The applicant argued that the motion had not been filed on a timely basis; and that, even if it were regarded as timely, it failed to put forth any valid grounds for disqualification. The staff advanced similar arguments. Dow opposed the motion primarily on the basis of timeliness.

With respect to the Saginaw Intervenors' exception VI. B, the applicant has urged that it be rejected. It generally asserts the same grounds on which it opposed the recall motion. But it also contends that the additional "evidence" of bias appearing in the exception was in fact a restatement of certain actions of the Licensing Board with which the intervenors disagreed and to which they had objected on the merits in other parts of their exceptions. The staff has indicated that the exception is "entirely without merit" and that it "generally" concurs in the applicant's comments.

For reasons hereinafter set forth, we have found (1) that the issue raised by the recall motion, as well as by the Saginaw Intervenors' exception VI. B, was not asserted in a timely manner, and (2) even if it had been timely asserted, there has been presented no bias which would require us to disqualify Chairman Murphy or either of the other members of the Licensing Board.

[4] *Northern Indiana Public Service Co.* (Bailly Generating Station, Nuclear 1), ALAB-76, WASH-1218 (Suppl. 1) 510 (October 30, 1972).

I

As is made eminently clear in their motion to recall and their exceptions to the initial decision, the intervenors' claim of bias is premised largely upon the views expressed by Chairman Murphy in his Columbia Law Review article. That article is a study of the impact of environmental legislation on the reactor licensing process. It was initially prepared as a report to the Committee on Licenses and Authorizations of the Administrative Conference of the United States. It adopts the general point of view that the National Environmental Policy Act (NEPA), or at least certain judicial constructions thereof, have imposed a burden on the reactor licensing process with which it cannot effectively cope. As illustrative examples of situations arising under NEPA which the author views as inconsistent with the current licensing structure, the article refers to certain assertions made in the *Midland* proceeding, as well as the litigation strategy adopted by intervenors in some cases.

The Saginaw Intervenors assert that the Board as a whole, but particularly Chairman Murphy, was "infused by a personal bias," thus rendering the initial decision a nullity. As evidence of bias the intervenors cite, in addition to the Columbia Law Review article, several selected rulings or record statements of the Licensing Board or its members. These will be discussed in greater detail later in this opinion (*infra*, pp. 65 and 66).

In their exceptions before this Board, the Saginaw Intervenors elaborate on the assertions which they had previously made before the Licensing Board. They characterize the article as showing a misunderstanding of the obligations of NEPA and a bias against enforcing that stat-

ute's mandate, and point to several parts of the initial decision where they believe that misunderstanding and bias to be manifested. Finally, they argue that disqualification does not require a showing that the bias of the Board members in fact affected the decision, but only that is in fact existed.

II

The assertions of the applicant, the staff, and Dow concerning the timeliness of the motion are founded on the purported knowledge of counsel for the Saginaw Intervenors (Myron M. Cherry) of the content of the law review article almost a year prior to the time that the recall motion was filed.

1. The article of course, appeared in the October, 1972, issue of the Columbia Law Review. Counsel for the Saginaw Intervenors states, in his supporting affidavit, that he did not receive a copy of that article until December 23, 1972, approximately a week after the issuance of the Licensing Board's initial decision.[5] In their motion, the Saginaw Intervenors assert that they "did not become fully aware until December 29, 1972, of the grounds of bias * * * and did not know until January 5, 1973 that the Regulatory Staff would itself refuse to take action consistent with this motion."[6] On the other hand, an affidavit of the counsel for Dow indicates that a copy of the October, 1972 issue of the Columbia Law Review was received in his office on November 6, 1972.[7]

But it is not relevant when counsel for the Saginaw Intervenors first learned of the law review article itself, because it is apparent that he should have become aware

[5] Affidavit of Myron M. Cherry, dated January 7, 1973, par. 4.

[6] Saginaw Intervenors' Motion, par. 3, p. 4.

[7] Affidavit of Milton R. Wessel, dated January 16, 1973, at p. 2.

of its general content, and of Chairman Murphy's views on the relationship of NEPA to the licensing process long before its formal publication. As we have indicated, the article itself evolved from an Administrative Conference report. The final report is dated August 1, 1972 but a first draft (which in relevant aspects is identical to the law review article) was circulated for comment to numerous interested persons and groups by letter of April 20, 1972 from the Chairman of the Administrative Conference.

Mr. Cherry was one of the addressees of that letter. His affidavit acknowledges that he became aware of the draft report "some time in the summer of 1972" but avers he did not deal with it at any great length because of his involvement in another proceeding.[8] In a supplement to their exceptions, the Saginaw Intervenors explained the delay from April, 1972 to the summer of 1972 on the basis that during the spring and summer, "Intervenors' counsel was spending full time in Washington, D.C. and thus was away from his office in Chicago."[9]

Whatever may have been the exact date on which Mr. Cherry became aware of the draft report, it seems clear that no later than the summer of 1972 he either was, or at the very least should have been, cognizant of the Board Chairman's views on the relationship of NEPA to the licensing process which later were published in the law review article.[10] Moreover, as the Board indicates in its denial

[8] Affidavit of Myron M. Cherry, dated January 7, 1973, par. 4, at pp. 3-4.

[9] "Motion and Supplement to Saginaw Valley, *et al.*, Intervenor's Statement of Exceptions to the Initial Decision filed on January 15, 1973," at p. 4. We agreed to consider this Supplement by our Order of January 23, 1973.

[10] We do not think it unreasonable to expect even a busy lawyer to take the time at least to peruse a received document in circumstances where (1) that document was authored by the Chairman of an adjudicatory tribunal before which he is representing a client

of the Saginaw Intervenors' motion, the Chairman and Mr. Cherry were co-panelists in November, 1971 at a session of an American Law Institute—American Bar Association Course of Study in Washington, D.C. at which both spoke on a number of the issues referred to in the law review article.

2. For motions for the disqualification of an adjudicator to be entertained, they must file in a timely manner. The Administrative Procedure Act, which applies to Commission licensing proceedings, explicitly so provides. 5 U.S.C. 556(b). The failure of a party to file a motion for disqualification once the information giving rise to such a claim is available to him amounts to a waiver of the disqualification objection. *Gilligan, Will & Co.* v. *S.E.C.*, 267 F.2d 461, 468 (2d. Cir. 1959). Moreover, as a matter of basic equity, a party in a proceeding such as this may not

> remain silent, await the decision of the Commission, and then, doubtless because of its disappointment, seek for the first time to asperse the objectivity of a quasi-judicial officer who joined in the challenged opinion.[11]

Any fair analysis of the Saginaw Intervenors' attempt to disqualify Chairman Murphy must lead to the conclusion that the Saginaw Intervenors are doing exactly what the *Safeway* court so explicitly disapproved. The issue raised by the Saginaw motion, as well as by exception VI. B., was clearly not asserted in a timely manner.

---

in major litigation; and (2) it is obvious from the title of the document that its subject matter has a direct relation to that specific type of litigation.

[11] *Safeway Stores, Inc.* v. *Federal Trade Commission*, 366 F. 2d. 795, 802 (9th Cir. 1966).

III

While we would have been justified in rejecting the intervenors' claim of bias solely on the basis of the untimely manner in which it was raised, we have nevertheless also considered it on its merits, and are rejecting it on that basis as well. In this part of this opinion, we shall discuss the statutory and judicial authority which we believe to be governing; and, in part IV, we shall apply that authority to the questions which are before us.

The grounds on which a member of an adjudicatory body such as an Atomic Safety and Licensing Board may be disqualified are both well-defined and well-recognized. The principal source of the governing rules respecting such disqualification is the Administrative Procedure Act, which is specifically applicable to the Commission's licensing proceedings.[12]

The Administrative Procedure Act recognizes essentially two broad categories of conduct which may give rise to disqualification from a particular proceeding of an agency employee who has adjudicatory responsibilities in that proceeding. First, the Act provides for a separation of the adjudicatory functions within an agency from investigative and prosecuting functions.[13] Secondly, the Act requires that the functions of presiding officers (which would include the functions of members of Atomic Safety and Licensing Boards) be "conducted in an impartial manner," and that a presiding officer may be disqualified for "personal bias or other disqualifications."[14]

The statutory language which underlies the second, and far broader, of these categories of disqualification is simi-

---

[12] Section 181, Atomic Energy Act of 1954, as amended, 42 U.S.C. 2231.

[13] 5 U.S.C. 554(d).

[14] 5 U.S.C. 556(b).

lar to that appearing in Section 21 of the Judicial Code,[15] which is applicable to the disqualification of federal district judges. The language is the outgrowth, as well as the subject, of a long line of judicial decisions. The basic rule has been elucidated by the Supreme Court in *In re Murchison* in the following terms:

> A fair trial in a fair tribunal is a basic requirement of due process. Fairness of course requires an absence of actual bias in the trial of cases. But our system of law always endeavored to prevent even the probability of unfairness. To this end no man can be a judge in his own case and no man is permitted to try cases where he has an interest in the outcome.[16]

From the judicial application of these general criteria to specific types of factual situations, there may be gleaned a number of identifiable types of conduct which have been viewed by courts as grounds for disqualification. Those will be described *seriatim:*

a. The first—and most obvious—situation calling for disqualification is one in which the adjudicator has a direct, personal, substantial pecuniary interest in a result which may be reached in a proceeding. *Tumey* v. *Ohio,* 273 U.S. 510 (1927).

b. Another equally obvious such situation is that where, in the terms of the Administrative Procedure Act, the adjudicator has a "personal bias." 5 U.S.C. 556(b). See also *Northern Indiana Public Service Co.* (Bailly Generating Station, Nuclear 1), ALAB-76, *supra,* at p. 511.

c. Under the specific provision of the Administrative Procedure Act, *supra,* an individual who has served a prosecutive function in a case may not thereafter serve in

[15] 28 U.S.C. 144.

[16] 349 U.S. 133, 136 (1955).

an adjudicative capacity, even though a substantial time period may have elapsed between his respective service in the two roles. Thus, the Chief Counsel and Staff Director of a Congressional Committee which conducted an investigation of the drug industry could not thereafter participate as a member of the Federal Trade Commission in a case involving the pricing practices of the same companies which were the subject of the Congressional investigation. *American Cyanamid Co.* v. *Federal Trade Commission,* 363 F.2d 757 (6th Cir. 1966).[17]

d. Prejudgment, as well as the appearance of prejudgment, has also been judicially recognized as a ground for disqualification; however, in fashioning the standard in this area, the courts have made it clear that the prejudgment which is proscribed is a prejudgment of *facts* in controversy *but not of legal issues.* Thus, in a landmark decision in this area, the Supreme Court found that the Secretary of Agriculture was not disqualified from participating in a proceeding on remand to his department, even though he had publicly criticized on policy grounds the court decision which had ordered the remand. Distinguishing sharply between the policy questions upon which the Secretary had spoken, and the factual issues which were to be considered by him on remand, the Court reasoned:

> That [the Secretary] not merely held, but expressed, strong views on matters believed by him to have been in issue, did not unfit him for exercising his duty in subsequent proceedings ordered by this Court.[18]

[17] See also *Texaco, Inc.* v. *Federal Trade Commission,* 336 F. 2d. 754 (D.C. Cir. 1964), vacated and remanded on other grounds, 381 U.S. 739 (1965); *Amos Treat & Co.* v. *S.E.C.,* 306 F. 2d. 260 (D.C. Cir. 1962). *Cf. Safeway Stores, Inc.* v. *Federal Trade Commission, supra; R. A. Holman & Co.* v. *S.E.C.,* 366 F. 2d. 446 (2d. Cir. 1966).

[18] *United States* v. *Morgan,* 313 U.S. 409, 421 (1941).

The Court also assumed that cabinet officers charged by Congress with adjudicatory functions were not "flabby creatures any more than judges are"; that "[b]oth may have an underlying philosophy in approaching a specific case"; and that "[b]oth are • • • men of conscience and intellectual discipline, capable of judging a particular controversy fairly on the basis of its own circumstances." [19]

The Supreme Court similarly has permitted members of the Federal Trade Commission to participate in a proceeding where it was charged that respondents had engaged in an unfair method of competition, and in price discrimination, arising out of a basing-point pricing system, even though the Commission had previously expressed views, in reports to Congress and in Congressional testimony, on the unlawfulness under the Sherman Act of the basing-point pricing system. As the Court stated:

> the fact that the Commission had entertained such views as the result of its prior *ex parte* investigations did not necessarily mean that the minds of its members were irrevocably closed on the subject of the respondents' basing-point practices.[20]

e. The federal courts have made it equally clear that the appearance of either bias or the prejudgment of factual—as opposed to legal—issues in controversy will disqqualify an adjudicator from participating in a proceeding. Thus, in two separate cases, the Chairman of the Federal Trade Commission was disqualified from participating in proceedings where he had previously made speeches which took a position on factual matters directly in controversy. *Cinderella Career and Finishing Schools, Inc.* v. *Federal Trade*

[19] *Ibid.*

[20] *Federal Trade Commission* v. *Cement Institute* 333 U.S. 683, 701 (1948); see also *Skelly Oil Co.* v. *Federal Power Commission*, 375 F. 2d 6 (10th Cir. 1967).

Commission, 425 F.2d 583 (D.C. Cir. 1970); *Texaco, Inc.* v. *Federal Trade Commission, supra.* In both cases, the court expounded its test for disqualification as being whether

> a disinterested observer may conclude that [the agency] has in some measure adjudged the facts as well as the law of a particular case in advance of hearing it.[21]

In emphasizing that the appearance of bias prejudgment is as valid a basis for disqualification as is actual bias or prejudgment, a court noted: "• • • an administrative hearing • • • must be attended, not only with every element of fairness but with the very appearance of complete fairness. Only thus can the tribunal conducting a quasi-adjudicatory proceeding meet the basic requirement of due process." *Amos Treat & Co.* v. *S.E.C.*, 306 F.2d 260, 267 (D.C. Cir. 1962).

Under this rule, actual bias or prejudgment need not be shown Indeed, the rule "may sometimes bar trial by [those] who have no actual bias and who would do their very best to weigh the scales of justice equally between contending parties." *In re Murchison, supra,* at p. 136. As one judge cogently remarked,

> We must presume that a fair hearing was denied if a disinterested observer would have reason to believe that the Commissioner had 'in some measure adjudged the facts • • • of a particular case in advance of hearing it.' [footnotes omitted].[22]

[21] *Cinderella Career and Finishing Schools, Inc.* v. *Federal Trade Commission, supra,* at p. 591; *Texaco, Inc.* v. *Federal Trade Commission, supra,* at p. 760 [in each case quoting language from *Gilligan, Will & Co.* v. *S.E.C.*, 267 F. 2d 461, 469 (2d Cir. 1959), cert. den. 361 U.S. 896 (1959)].

[22] *Texaco, Inc.* v. *Federal Trade Commission, supra,* concurring opinion of Judge Washington, 336 F. 2d at p. 764.

The rule governing the appearance of bias or prejudgment is ex-

In sum, therefore, an administrative trier of fact is subject to disqualification if he has a direct, personal, substantial pecuniary interest in a result; if he has a "personal bias" against a participant; if he has served in a prosecutive or investigative role with regard to the same facts as are in issue; if he has prejudged factual—as distinguished from legal or policy—issues; or if he has engaged in conduct which gives the appearance of personal bias or prejudgment of factual issues.

IV

As previously pointed out, the Saginaw Intervenors' claim of bias is premised largely upon the views expressed by Chairman Murphy in his Columbia Law Review article. But, as the Licensing Board indicated in its order of February 1, 1973 denying the claim of bias, the exact legal grounds on which disqualification is being sought are not entirely clear. The Licensing Board treated the claim as one of prejudgment since it was unaware of any circumstances which could give rise to a claim of personal bias—*i.e.*, the manifestation of animosity or partiality toward one or more of the parties or their counsel. Our review of the record convinces us that the Board was justified in so treating the claim.

What, then, might Chairman Murphy or other members of the Board have prejudged? As is clear from the affidavit of intervenors' counsel in support of the recall motion, the gravamen of interventors' complaints is that, before the *Midland* case had become ripe for adjudication, Chairman Murphy had reached certain conclusions. Specifically, according to counsel, he—"and hence the Board"—had decided that NEPA was "interfering with the production

pounded in greater detail in the opinion we are issuing today in the *LaSalle* proceeding, to the facts of which we have found that rule applicable. *Commonwealth Edison Co.* (LaSalle County Nuclear Power Station, Units 1 and 2), ALAB-102.

of needed energy and development of nuclear power" and, accordingly, had failed to fulfill the requirements of NEPA. For this proposition, the affidavit pointed solely to the law review article.

It is true, of course, that the article expressed skepticism regarding whether the requirements of NEPA could be fulfilled in the existing licensing process. But the exposition of such thoughts on legal matters was sanctioned by the Supreme Court in its *Morgan* and *Cement Institute* decisions, *supra*. Moreover, we note that the Licensing Board disclaims any belief on its part that NEPA is not to be enforced:

> • • • the Chairman, in his law review article, expressed the view that the present licensing structure is not adequately designed to handle the job which has been given to it by the legislature and the courts. The Board, notwithstanding the Chairman's view that the system is inadequate to the job, took the case as given to it and did the best job it could. [Licensing Board's Order at p. 4.]

We turn now to exception VI. B of the Saginaw Intervenors, which points to specific sections of the law review article as indicating prejudgment. Those sections discuss such matters as the ability of licensing boards to conduct a meaningful environmental review, the general utility of the Commission's operating license hearings, whether NEPA can be used to nullify an agency's regular mission. Again, these are legal issues, and not factual questions in dispute in this proceeding.

It is true that the Saginaw Intervenors emphasize a statement in the article concerning the inevitability of the need for a substantial increase in generating capacity[23] —which is a factual matter. Saginaw Intervenors assert

[23] 72 Col. Law Rev. at p. 963.

that the need for additional generating capacity is an issue in this proceeding. But even though Chairman Murphy may believe that "it seems inevitable that there will have to be a substantial increase in generating capacity, over the next ten years," it does not follow that the *Midland* facility—or indeed any other particular reactor—need be built. In this connection, we find nothing in the article or in the record to suggest that to any extent the Chairman related his general observations respecting increased overall electric power needs to the question as to whether the issuance of a construction permit for this specific plant should be authorized.

Reviewing the entire law review article, including each of the passages to which the Saginaw Intervenors have referred, we find no evidence of prejudgment of any facts in issue. Nor do we find any appearance of prejudgment. All that we find is an individual who may have certain crystalized views—indeed, who may possess an "underlying philosophy"[24]—on the application of NEPA to the Commission's licensing process. Previous decisions of this Board and the Commission have explicitly recognized this situation as nondisqualifying. Thus, in the *Bailly* case, we referred to Professor Davis' view, based on his analysis of the jurisprudence in this area, that "the fact that a member of an adjudicatory tribunal may have a crystallized point of view on questions of law or policy is not a basis for his disqualification."[25] And in an earlier decision, the Commission squarely ruled that

> Philosophic or professional attitudes or similar, generalized mental attitudes do not constitute disqualifying bias.[26]

---

[24] *U.S.* v. *Morgan, supra,* at p. 421.

[25] *Northern Indiana Public Service Co.* (Bailly Generating Station, No. 1), ALAB-76, *supra,* at p. 511.

[26] *In the Matter of Long Island Lighting Co.* (Shoreham Nuclear Power Station Unit No. 1), Commission Memorandum and Order dated October 28, 1970, at p. 5.

Siganaw Intervenors additionally cite remarks by various members of the Licensing Board, and Licensing Board rulings, which are said to be "clear statements of bias."[27] Taken in context, none of the cited remarks or rulings in our view indicates any bias or prejudgment of facts in issue. To the extent, if any, that they may indicate a view on legal matters in issue, they are of course subject to our pending review on the merits, as is also the Board's approach and rulings in applying the dictates of NEPA to this proceeding.

V

We have determined that, measured against the settled principles relating to disqualification for personal bias or prejudgment, the law review article in question does not provide a legally sufficient basis for the invalidation of the initial decision of the Licensing Board in this proceeding. We do not, however, wish that conclusion to be taken as a tacit approval of the publication of that article by the Chairman of the Board. We make, therefore, these few additional observations.

We appreciate that the Chairman performs his adjudicatory function for the Commission on a part-time basis and that he has other significant responsibilities which are entitled to recognition. It is also true that, as previously noted, the genesis of the article was a report he had prepared for the Administrative Conference of the United States. But considerations of this nature do not lessen the distinct obligation of an adjudicator to exercise particular care to avoid doing anything—in a governmental or private capacity—which might erode public confidence in his ability to dispatch his quasi-judicial duties in an entirely dispassionate manner.

---

[27] Affidavit of Myron M. Cherry, dated January 7, 1973, par. 10.

The fulfillment of this obligation may not wholly foreclose a widely-disseminated critique on the adjudicatory process of which he is a part, or on a statute (*e.g.* NEPA) which he is called upon to enforce. But we believe that greater circumspection might have been in order in this instance. In this regard, we have particular reference to the allusions in the article to the *Midland* case itself. Although these allusions may have been deemed perfectly innocuous by their author, it seems of doubtful prudence for an adjudicator to comment in such fashion upon any aspect of a case still before him for decision.

VI

For the foregoing reasons, we conclude that the Saginaw Intervenors' claim of bias or prejudgment was not submitted on a timely basis and, in any case, did not advance any valid reasons for disqualification of Chairman Murphy or either of the other Board members. Accordingly, the Licensing Board's Order Denying Motion to Recall and Revoke Initial Decision, dated February 1, 1973, is *affirmed*. The Saginaw Intervenors' exception to VI.B to the initial decision is *denied*, without prejudice to our later consideration on the merits of the substantive matters raised therein.

It is so ORDERED.

FOR THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

MARGARET E. DUFLO
Secretary to the Appeal Board

Dated February 20, 1973

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

ALAN S. ROSENTHAL, *Chairman*
DR. JOHN H. BUCK, *Member*
WILLIAM C. PARLER, *Member*

In the Matter of
CONSUMERS POWER COMPANY (Midland Plant, Units 1 and 2) — Docket Nos. 50-329, 50-330

Mr. HAROLD F. REIS, Washington, D.C., for the applicant, Consumers Power Company.

Messrs. MYRON M. CHERRY and ROBERT GRAHAM, Chicago, Illinois, for the Saginaw Intervenors (Saginaw Valley Nuclear Study Group, et al.).

Mr. HAROLD J. VOGEL, Minneapolis, Minn., for the Mapleton Intervenors (Nelson Aeschliman, et al.).

Mr. MILTON R. WESSEL, New York, N.Y. (Mr. JAMES N. O'CONNOR, Midland, Mich., with him on the brief), for the Intervenor Dow Chemical Company.

Mr. DAVID E. KARTALIA, for the AEC Regulatory Staff.

Memorandum and Order

(ALAB-106)

By initial decision dated December 14, 1972, the Atomic Safety and Licensing Board authorized the Director of Regulation to issue construction permits to Consumers Power Company (applicant), for a dual purpose pressurized water nuclear power plant, designated the Midland Nuclear Plant, Units 1 and 2. The plant, which is designed to produce not only electricity but, as well, process steam to be sold by applicant to the Dow Chemical Company, would be located

on the south shore of the Tittabawasee River in Midland County, Michigan at a site adjacent to an existing plant of the Dow Chemical Company.

Separate sets of exceptions to the initial decision were filed by the Mapleton Intervenors and the Saginaw Intervenors. Responses in support of the initial decision were filed by the applicant and the AEC regulatory staff. The Dow Chemical Company, another intervenor, filed a memorandum indicating support of the responses filed by the applicant and staff. Oral argument was directed by our order of February 12, 1973 (ALAB-100) and was held on March 14, 1973. Each of the above-mentioned parties participated.

We have not at this time completed our consideration of all of the many issues raised in this case. We nevertheless have determined that, with respect to one particular aspect of the case—quality assurance and quality control (QA)—, prompt decision and action on our part are necessary. Based on our review of the record, including the relevant exceptions and responses thereto, and the oral argument, we have concluded that the initial decision reflects an erroneous view of the ambit of a board's responsibilities in the QA area and, as a result, inadequately deals with issues which have been raised in that area (see transcript of oral argument, pp. 46-47, 78-106, 122-136, as well as Saginaw Intervenors' Exception III.F.). Since we find the record sufficient for us to resolve those issues and to impose conditions which will satisfy applicable requirements, we hereby do so, and are modifying the initial decision to reflect both the additional findings and the supplementary conditions wihch we believe are necessary on this record.

I

One of the most significant elements of the Commission's "defense-in-depth" approach to nuclear safety is its emphasis upon quality assurance and quality control in the

construction of nuclear power plants. Under current regulatory provisions, every applicant for a construction permit is required by 10 CFR § 50.34 to include in its preliminary safety analysis report (PSAR) a description of the QA program to be applied to the design, fabrication, construction, and testing of the structures, systems and components of the facility. Specific criteria for QA programs are spelled out in Appendix B to 10 CFR Part 50. Among other things, the regulations require the description of the QA program to include "a discussion of how the applicable requirements of Appendix B will be satisfied," 10 CFR § 50.34(a)(7).

Before the Licensing Board, the Saginaw Intervenors raised the issue whether the applicant would be likely to implement properly the QA program. In this connection, there were introduced into evidence AEC inspection reports which described, *inter alia*, a number of deficiencies in the applicant's implementation of the QA program in connection with work under a previously granted exemption.[1]

The Licensing Board considered the issue of quality assurance and quality control in paragraphs 28 and 29 of the initial decision. The Board also made the ultimate findings required by AEC regulations as a predicate to the issuance of a construction permit, including those encompassing the technical qualifications of the applicant and public health and safety matters. (Initial Decision par. 80(3) and (5)). The Board held that its only function respecting quality assurance and quality control was to ascertain whether the applicant has adopted a QA program which, *if implemented in accordance with the representations of the application*, will satisfy the requirements of Appendix B. The Board found it to be the responsibility of the Director of Regulations—and consequently beyond the ambit of its own re-

[1] AEC Compliance Office Reports 329 and 330/70-1 through 329 and 330/71-1, introduced as Saginaw Intervenors' Exhibit 36 (Tr. 4571).

sponsibility—to assure that the program was in fact carried out as approved. (Initial Decision, par. 28).

The Licensing Board acknowledged that the AEC inspection reports in the record reflected, *inter alia*, some deficiencies in the applicant's implementation of the QA program in the construction activity which the applicant carried out under its exemption. The Board stated that it had considered these reports, but only for the limited purpose of determining whether there was "any evidence" which would be inconsistent with its making findings favorable to the applicant on the ultimate issues in the proceeding (e.g., technical qualification of the applicant, and whether issuance of construction permits would be inimical to the public health and safety). In that narrow context, it found "no such evidence."[3]

In Exception III. F., the Saginaw Intervenors challenge the Licensing Board's disposition of this issue, contending that the evidence in the record of "shoddy" QA practices demonstrates that the applicant is "incapable of, and cannot be relied upon to, perform adequate quality assurance and quality control."[4] Further, the intervenors assert that, as a matter of law, more must be shown than "merely the adoption of a plan in compliance with Appendix B"; that in addition there must be established "the workability of the plan and the probability that the applicant and the contractor will follow the plan."[4]

In their briefs, the applicant and staff supported the Board's approach. They took the position that only the program was in issue, and that details relating to enforcement were outside the scope of the proceeding.[5] But at the

[3] Initial decision, par. 29.

[4] Saginaw Intervenors' Exceptions, p. 53-24.

[4] *Id.*, p. 53-27 (fn. 15j).

[5] Applicant's Brief, p. 49; Staff's Brief, p. 28.

oral argument before this Board, both the applicant and staff modified this view: they now appear to concede the relevance of such reports, but only as to whether the applicant (including its architect-engineer) is technically qualified.[6]

II

We turn first to the question as to whether it is permissible for a licensing board, in a situation such as is here presented, to limit its inquiry—as the Licensing Board here did—to determining merely whether the applicant has adopted a QA program which, if implemented in accordance with the representations of the application, will satisfy the requirements of Appendix B. We conclude that, in the circumstances of this case, the Board was entitled to do so.

No QA program is self-executing. Thus, irrespective of how comprehensive it may appear on paper, the program will be essentially without value unless it is timely, continuously and properly implemented. This being so, it seems to us to follow that it is not enough for a licensing board to satisfy itself that, *if* implemented, the program described in the PSAR will adequately protect the health and safety of the public. At least where, as here, there has been a legitimate question raised in the course of the proceeding, the board must go on to inquire into whether there is, in fact, a reasonable assurance that the applicant and its architect-engineer *will* carry out the program in accordance with its terms. And, if the inquiry leads it to conclude that the record does not permit an affirmative finding on that score, it then becomes the board's responsibility to take whatever action is required—including possibly the outright denial of the construction permit—to provide some measure of assurance that there will not be an improperly

[6] AB Tr. 88-89, 123-126.

constructed facility which might present safety problems.[7]

The inquiry which the board must make is not necessarily resolved by a determination of whether, in a broad sense, the applicant and its architect-engineer are "technically qualified." A demonstration that technical qualifications do exist does not necessarily provide reasonable assurance that the QA program described in the PSAR will be faithfully fulfilled. To the contrary, as important as qualifications may be, of no less significant is the matter of managerial attitude. Unless there is a willingness—indeed, desire—on the part of the responsible officials to carry it out to the letter, no program is likely to be successful.

Based on these considerations, we hold that the Licensing Board viewed the scope of its QA inquiry, as expressed in paragraph 28 and 29 of the initial decision, too narrowly. In the context of the present proceeding, it was incumbent upon the Board to do more than simply ascertain, as it did, that if the QA program were implemented in accordance with the representations in the application, the requirements of Appendix B would in fact be satisfied. The Board also should have determined whether there was a reasonable assurance that the applicant and its architect-engineer would carry out the terms of the program.

---

[7] We recognize, as did the Licensing Board, that, with respect to quality assurance (as well as other aspects of reactor construction and operation), the regulatory staff has on-going enforcement responsibilities to make certain that the permittee or licensee complies with all of the requirements imposed upon it. But this consideration scarcely affects a Licensing Board's duty, *prior* to authorizing a construction permit, to resolve legitimate questions relating to the likelihood that the applicant will fulfill those requirements. The presence of police officers on the highways is, after all, not deemed to justify the issuance of a motor vehicle license to a person who does not offer a reasonable assurance that he both can and will comply with the traffic laws which those officers are charged to enforce.

III

With these principles in mind, we now turn to a consideration of those portions of the record which bear upon the applicant's QA program. To begin with, we have found nothing which would cause us to overturn the Licensing Board's findings as to the consistency of the QA program with the requirements of Appendix B. We have reviewed the QA manuals for both the applicant and its architect-engineer. Both of these manuals, as presently revised, appear to present a satisfactory overall program to meet the quality assurance criteria of Appendix B. Insofar as implementation of the program is concerned, however, a review of the evidence in this case causes us serious concern.

The basis for this concern is illuminated by the contents of the AEC inspection reports in evidence. Compliance inspection of the Midland facility began on January 14, 1970, with a meeting held at the plant and attended by several representatives of the applicant and at least one representative of Bechtel Corp., the architect-engineer.[8] The purpose of the meeting was "to inform the applicant of the purpose, scope, and organization of the forthcoming intensive QA review of the QA program for the Midland project."

An initial QA inspection was made on March 10, 11 and 12, 1970,[9] in which the applicant's QA program itself was discussed and deficiencies then existing to the program described in terms of the various criteria of Appendix B. Some discrepancies were noted which involved Criteria II, IV, VI, IX, X, XI, XII, XIV and XV. A discussion of these discrepancies was held with the applicant's management personnel on April 7, 1970 in order to verify their understanding with regard to the QA program; the report reflect-

---

[8] CO Report No. 329 and 330/70-1.

[9] CO Report No. 329 and 330/70-2.

ed that the applicant "indicated intent to resolve each of the deficiencies in a timely manner." [10]

A second inspection was held on May 1, 1970 [11] to "(a) review both CP and Bechtel's plans for site QA/QC activities, (b) determine extent of implementation, (c) review work performance and QC procedures and record keeping practices, and (d) determine the status of excavation efforts." QA programs for the Midland project covering such areas as excavations, foundation preparation, concrete placement and reinforcement steel were reviewed. During the day an inspection was made of the testing laboratory facilities and discussions held on the required QC documentation.

A further inspection was made on June 26, 1970, during which a detailed discussion was undertaken concerning the applicant's QA program. In particular, the discussion centered on the placement of concrete, and the applicant's QA audit involving such matters as air tests, cylinder tests, vibration of concrete, concrete temperature, clump-time, and pour records. The report of this inspection noted that the applicant on May 28, 1970 had requested an exemption under 10 CFR Part 50 to proceed with certain work prior to the granting of a construction permit.[12] The report further reflected Bechtel's intent, if such an exemption should be granted, to have several persons at the site who had expertise in such things as batch plant operations and concrete placement. According to the report, Bechtel stated its onsite personnel would collectively have the necessary qualifications to handle all of the work anticipated under the exemption. Similarly, the applicant stated that its staff "will be adequate to control the work contemplated under the exemption."

[10] CO Report No. 329 and 330/70-3.

[11] CO Report No. 329 and 330/70-4.

[12] CO Report No. 329 and 330/70-5.

The next inspection was made between September 29 and October 1, 1970, during which period work was proceeding under the exemption received by the applicant on July 30, 1970. The report of this inspection noted, *inter alia,* the following examples of nonconformance with the QA program:[13]

1. improper use of vibrators during concrete pours;

2. improper testing of the concrete by the site's testing laboratory;

3. improper sampling of the concrete for slump tests; and finally

4. "the QA and QC inspection personnel present at the concrete pour location did not promptly identify and correct apparent deviations from the ACI-301 Standard regarding consolidation of concrete."

It is apparent from the foregoing that the architect-engineer did not have properly trained construction personnel to handle the vibration of the concrete and that neither he nor the applicant had QA engineers on site sufficiently knowledgeable in concrete work to recognize the deficiencies in the procedures. As reflected in the inspection report, the architect-engineer and applicant once again stated that they expected to have properly trained crews and inspection on site for further operations.

The last inspection prior to shutdown of construction was made on January 7, 1971. At that time, the applicant was questioned about advance planning to "restore the site to full construction status when required." [14] A representative of the applicant stated that this planning was the architect-engineer's responsibility and that "he anticipated that it would include adequate steps to verify the integrity of the

[13] CO Report No. 329 and 330/70-6.

[14] CO Report No. 329 and 330/71-1.

existing structures, etc., before resuming construction." The inspection report states that "the applicant was urged to give consideration to this aspect of the facility shutdown status."

On the basis of the evidence summarized above, we find that neither the applicant nor the architect-engineer has provided reasonable assurance that the QA program will be implemented properly, even though both organizations have experience in building reactors. They have in this project not demonstrated their concern with maintaining QA programs in synchronization with their construction programs, nor have they demonstrated that they will have properly trained people on site to implement the QA program.

We deem it no answer that, as suggested by a staff witness, deficiencies such as the type disclosed here are "typical problems that occur" and "fall into a general category of problems that we do run into continually in our inspection work at Midland and other sites." [15] We would like to think that such failures to adhere to a QA program are not accepted as normal in reactor construction. In any event, the heart of the confidence in engineered safety features lies in the assurance that the quality of construction fully meets all specifications.

Despite the failure of the Board to deal adequately with QA issues, it did not reject any evidence offered on this subject. Moreover, the record not only includes extensive information on the QA aspects of construction but it also shows that the actual structural work which has been performed on the Midland plant appears to be satisfactory.[16]

[15] Tr. 4608-09.

[16] CO Report No. 329 and 330/71-1. This, of course, does not mitigate the seriousness of the deviations from proper quality assurance practices; since the Commission has accepted certain Code requirements as a necessary concomitant of proper quality assurance, the fact that structural deficiencies did not result must be accredited to pure luck or happenstance.

For these reasons, there would be little utility in remanding the case to the Licensing Board for further findings or evidentiary proceedings.

IV

Because of the history of the failure of the applicant and the architect-engineer to observe the required QA practices and procedures, as documented in this record, we have concluded that additional QA conditions must be imposed upon the applicant. These conditions, to which the outstanding construction permits are to be deemed subject, and which are to be considered as a predicate for the permits now to remain in effect, are as follows:

1. By April 9, 1973, or the date of resumption of construction activities (whichever is later), the applicant shall furnish a complete report to this Board, with copies to all other parties to his proceeding, on the quality assurance action being undertaken by the applicant and/or its architect-engineer to assure that the construction work already performed and the materials now on the site are in satisfactory condition. This report, in addition to covering actual construction work and materials, shall also cover inspection and calibration of instrumentation to be used in the QA program.

2. On the date specified in condition 1, *supra*, and on the first day of each calendar quarter thereafter, reports shall be submitted to the regulatory staff on the construction work to be performed during that quarter. Such reports shall contain the names of the QA supervisors and engineers of both the applicant and the architect-engineer who will be on site during the period covered by the report.

3. A statement of the QA qualifications of each individual named in the reports required by conditions 1 and 2

will be supplied in the report in which he or she is first mentioned.

4. A monthly nonconformance report covering the previous month's work will also be forwarded to the staff, with enough detail so that the reasons for the discrepancies, if any, will be apparent. When a discrepancy is discovered too near the end of the reporting period to permit determination of adequate corrective measures by the end of the period, the corrective measures shall be given in the next monthly report.

This Board requests that, for its information, copies of all reports required by conditions 2, 3, and 4, *supra,* be forwarded to it by the staff on a timely basis, together with any comments that the staff may have. This Board would also appreciate receiving staff comments on the report required by condition 1, and these comments should include the results of any staff inspection.

It is the expectation of this Board that the staff will closely monitor the activities of the applicant and architect-engineer with reference to the QA program described in the PSAR, as that program has been or may be amended. To this end, the staff's enforcement responsibilities are in no way limited by the conditions herein prescribed, and the staff is free to take any remedial action over and above these conditions which it may deem necessary.

V

Since we have not completed our consideration of the other exceptions which have been filed, and the other aspects of the initial decision, we express no view on them now. In taking this action, however, we do not wish to be understood as endorsing a practice of piecemeal review of licensing-board actions. Such review usually would be contrary both to views which we have previously expressed,[17] and

[17] *Wisconsin Electric Power Co., et al.* (Point Beach Nuclear Plant, Unit 2), ALAB-87, WASH-1218 (Suppl. 1) 578 (December 22, 1972).

to the spirit of the Commission's Rules of Practice.[18] In normal circumstances we would dispose of all of the issues posed by exceptions and by an initial decision in one opinion. Here, however, we viewed the evidence in the quality assurance area as constituting a special circumstance which warranted an unusual course of action—particularly our view of the possibly imminent resumption of construction and the concomitant importance of assuring adequate QA activities in connection with such construction. Hence, we factored out the single issue with which we have here dealt.

Accordingly, the initial decision, and the construction permits issued as a result thereof, are hereby modified to the extent indicated in this opinion. At a later date this Board will render a further opinion, disposing of the remaining exceptions.

It is so ORDERED.

FOR THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

MARGARET E. DUFLO
Secretary to the Appeal Board

Dated: March 26, 1973

[18] Cf. 10 CFR § 2.730(f).

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

ALAN S. ROSENTHAL, *Chairman*
DR. JOHN H. BUCK, *Member*
WILLIAM C. PARLER, *Member*

In the Matter of
CONSUMERS POWER COMPANY (Midland Plant, Units 1 and 2) — Docket Nos. 50-329, 50-330

Mr. HAROLD F. REIS, Washington, D.C., for the applicant, Consumers Power Company.

Messrs. MYRON M. CHERRY and ROBERT GRAHAM, Chicago, Illinois, for the Saginaw Intervenors (Saginaw Valley Nuclear Study Group, *et al.*).

Mr. HAROLD J. VOGEL, Minneapolis, Minn., for the Mapleton Intervenors (Nelson Aeschliman, *et al.*).

Mr. MILTON R. WESSEL, New York, N.Y. (Mr. JAMES N. O'CONNOR, Midland, Mich., with him on the brief), for the Intervenor, Dow Chemical Company.

Mr. DAVID E. KARTALIA, for the AEC Regulatory Staff.

Decision

(ALAB-123)

On December 14, 1972, the Licensing Board issued an initial decision, authorizing the issuance of construction permits to the Consumers Power Company (applicant) for the Midland Plant, Units 1 and 2. Before us are separate sets of exceptions to that decision which were filed by the Mapleton and Saginaw Intervenors, as well as a Motion of the Saginaw Intervenors dated March 28, 1973, seeking to supplement the record on appeal with certain "newly discovered information."

We have heretofore considered and ruled on two of the Saginaw Intervenors' exceptions which we regarded as raising questions which should be decided prior to our resolution of the remaining issues encompassed by the myriad of exceptions filed. In ALAB-101, RAI-73-2 60 (February 20, 1973), we denied the Saginaw Intervenors' exception VI. B, insofar as it sought to disqualify the members of the Licensing Board because of alleged bias or prejudgment. Subsequently, in ALAB-106, RAI-73-3 182 (March 26, 1973), we disposed of the issue which had been raised with respect to quality assurance and quality control in Saginaw Intervenors' exception III. F. We now turn to the remaining issues.

An adequate description of the reactor under consideration, and of the procedural background against which we are responding to various exceptions, appears in ALAB-106, *supra*, and need not be here reiterated. Following our issuance of ALAB-106, the Saginaw Intervenors on March 28, 1973, filed with this Board a Motion and Supplement to their previously filed exceptions, seeking to supplement the record on appeal with "newly discovered information." That information consisted of a letter from the Advisory Committee on Reactor Safeguards (ACRS) to the AEC Chairman dated December 18, 1972, and a responsive letter dated February 3, 1973, both concerning the generic resolution of certain issues relating to the safety of light-water cooled reactors. The applicant and staff opposed the motion on grounds of lack of timeliness and of nonrelevance. While it is not clear exactly when the Saginaw Intervenors became aware, or should have become aware, of the exchange of correspondence, the letters in question are possibly relevant to certain of the Saginaw Intervenors' exceptions. That being so, and since in any event the letters are public records on file in the AEC Public Document Room of which

we may take official notice, we have considered them in reaching the decision we render today.

Based on our review of the entire record and for reasons hereinafter set forth, we find no occasion to alter the result reached in the initial decision. Accordingly, that decision, as modified by ALAB-106, is hereby *affirmed.*

I. Questions Relating to Intervenors' Failure To File Adequate Proposed Findings and Conclusions

Before reaching the merits of any of the specific exceptions which have been filed, we treat a question upon which the Licensing Board focused in its initial decision, and which also is discussed by the applicant in its briefs in opposition to the various exceptions—namely, the failure of either the Mapleton or Saginaw Intervenors to file adequate proposed findings of fact and conclusions of law, and the effect of such failure upon those parties' further participation in the proceeding.

1. As the Licensing Board pointed out, the Saginaw Intervenors participated in the radiological hearing but not in the environmental hearing; the Mapleton Intervenors fully participated in the environmental hearing but played a relatively limited role in the radiological hearing. In response to the Licensing Board's request, each group submitted what purported to be proposed findings of fact and conclusions of law.

The Saginaw Intervenors' submission, dated September 15, 1972, expressly stated with respect to environmental issues, which were considered in the phase of the proceeding in which the Saginaw Intervenors did not participate, that the intervenors had "no conventional findings of fact to set forth." Concerning radiological issues, where they played a significant role in developing the record, those intervenors stated that they "have not • • • chosen to search the record and respond to this proceeding by submitting citations of matters which we believe were proved or disproved."

The Mapleton Intervenors on September 14, 1972, submitted proposed findings and conclusions which covered both radiological and environmental matters but, as the Licensing Board indicated, fell "far short of the specification and detailed required by the Regulations."[1] We note in this regard that there was no record citation whatsoever for any of the 37 proposed factual findings, which in fact were little more than restatements of previously filed contentions.

The failure of both the Saginaw and Mapleton Intervenors to file adequate proposed findings of fact and conclusions of law highlights what we view as an area of concern in the functioning of the adjudicatory process in Commission licensing proceedings—i.e., the role of intervenors. Intervenors frequently enter Commission licensing proceedings, including this one, with broad and far-ranging contentions. They have been afforded, and have utilized, the full range of the Commission's discovery procedures. But, even after obtaining a plethora of information through discovery, they have presented limited direct evidence and have often confined their evidentiary cases to the conduct of cross examination. In this proceeding, they affirmatively failed to file adequate proposed findings and conclusions, even though they were asked by the Licensing Board to do so.[2] Now, after the Licensing Board has issued a decision with which they disagree in many respects, they file exceptions with this Board which challenge, *inter alia,* numerous factual findings of the Licensing Board.

Participation in this manner, in our opinion, subverts the entire adjudicatory process. One of the justifications

---

[1] Initial Decision, at p. 10.

[2] "Post Hearing Order," dated June 28, 1972.

for public participation in that process is the additional input which intervenors may contribute to the identification and resolution of relevant issues, and the assistance they may provide an agency in fulfilling its statutory mandates.[3] In short, the right of participation in an administrative proceeding carries with it the obligation of a party to assist in "making the system work" and to aid the agency in discharging the statutory obligations with which it is charged.

Section 2.754 of the Commission's Rules of Practice, 10 CFR § 2.754, gives a party the right to file proposed findings and conclusions, and also provides that a board may require that they be filed. In doing so, the rule recognizes that the filing of proposed findings and conclusions by parties is likely to be of substantial benefit to a licensing board in resolving various questions which are at issue in a proceeding—particularly one such as this which involves complex factual questions and a lengthy record which includes a variety of expressed opinions on the various facets of reactor operation. If nothing else, such proposed findings will assist a board in determining what issues in fact exist between the parties, and what issues are either not actually in dispute or not relevant to the eventual decision which must be rendered.

Recognizing this, the Licensing Board here asked the parties for proposed findings and conclusions.[4] Compliance with this request might well have facilitated the decisional process in this case. For, as the Board noted, the failure of the Saginaw and Mapleton Intervenors adequately to comply with the request greatly complicated its task in

[3] *Office of Communication of the United Church of Christ* v. *F.C.C.*, 359 F. 2d 994, 1005 (D. C. Cir. 1966); see also Ernest Gellhorn, "Public Participation in Administrative Proceedings," 81 Yale Law Journal 359 (January, 1972).

[4] "Post Hearing Order," dated June 28, 1972.

reaching a decision, and "has made it virtually impossible in some instances to know whether particular issues are in fact contested."[5]

2. The Commission's Rules of Practice do not mandate a sanction for failing to file adequate proposed findings and conclusions, but do provide that such failure may be deemed a "default" and that "an order or initial decision may be entered accordingly."[6] In treating the intervenors' failure here as a "default," the Licensing Board opined that it could strike the interventions and treat the proceeding as uncontested.[7] It declined to do so, however, in view of the extensive participation of the intervenors in, and their strong influence on, the conduct of the proceeding. Expressing some reservation over a course of action which would permit intervenors to avoid the burden of preparing proposed findings and at the same time reserve the right to attack the Board's decision once made,[8] the Board nevertheless treated as contested issues of fact those to which the intervenors introduced affirmative evidence or engaged in substantial cross-examination; and, with respect to conclusions of law, it attempted to deal with those quesions which it understood to be raised by the proposed conclusions in the light of earlier contentions of the intervenors. The Board left open for our consideration ("when and if there are exceptions") the question of the effect of the intervenors' failure to file adequate proposed findings and conclusions.

Since we are obliged to review the Board's initial decision in this proceeding whether or not exceptions are filed, we are not inclined to dismiss a party from further partici-

[5] Initial Decision, par. 9, at p. 10, fn. 10.

[6] 10 CFR § 2.754.

[7] Initial Decision, par. 9, at p. 11.

[8] *Cf.* ALAB-101, RAI-73-2 60, at p. 63 (Feb. 20, 1973).

pation as a result of its failure to file proposed findings and conclusions. But that does not mean that we cannot take that failure into consideration in ruling upon exceptions filed by that party. Equity to the various parties to this proceeding requires that we accord the failure to file proposed findings some significance, to avoid the intolerable situation where a party may elect to

> remain mute and await the outcome of an agency's decision and, if it is unfavorable, attack it on the ground of asserted procedural defects not called to the agency's attention when, if in fact they were defects, they would have been correctable * * **

It is no answer that, as the Saginaw Intervenors' counsel pointed out at the oral argument before this Board, the Licensing Board refused to declare the intervenors in default.[10] As we have seen, the Board expressed its displeasure with the default of the intervenors but left it to us to consider an appropriate remedy. Furthermore, the contention of the Saginaw Intervenors that the Licensing Board unduly proscribed their activities and cross-examination and their right to discovery, so that there in fact was "no hearing" on the issues which they believe were significant,[11] is hardly persuasive. Many issues as to which the Saginaw Intervenors took a strong position were the subject of extensive consideration by the Licensing Board. At least as to those issues, the failure to file proposed findings represents a clear default. As to the others, we believe the Licensing Board was entitled to a post-hearing specification of areas in which the intervenors contend that errors were committed.

---

[9] *First-Citizens Bank and Trust Co.* v. *Camp*, 409 F. 2d 1086, 1088-9 (4th Cir. 1969). See and compare *Easton Utilities Commission* v. *AEC*, 424 F. 2d 847, 851 (D. C. Cir. 1970).

[10] AB Tr. 10.

[11] AB Tr. 13.

Accordingly, while we do not exclude the intervenors from further participation as a result of their failure to file adequate proposed findings and conclusions, we shall take this failure into account, particularly in assessing the adequacy of the specific factual findings which have been challenged by the intervenors.[12]

II. Description of the Exceptions

The more voluminous of the exceptions filed are those of the Saginaw Intervenors. Covering some 195 pages, those exceptions are divided into 7 major sections: an introduction; separate sections dealing with procedural and substantive matters affecting the radiological portion of the decision (14 and 6 exceptions, respectively); similar separate sections dealing with procedural and substantive matters affecting the environmental portion of the decision (10 and 12 exceptions, respectively); another section dealing with matters affecting the entire initial decision (7 exceptions); and a final section containing one "miscellaneous" exception. The Mapleton Intervenors have filed 12 exceptions, 4 of which relate to the radiological portions of the decision, and the remainder of which concern environmental issues.

There is a significant amount of subject-matter overlap between the two sets of exceptions, and also between the exceptions filed in various categories of the Saginaw Intervenors' exceptions. In the interest of clarity, we have attempted to group the exceptions of both groups of intervenors into the subject-matter categories to which they appear to relate, and to deal with the exceptions on a given subject collectively.

---

[12] While this discussion has been in terms of the obligations of intervenors, it goes without saying that other parties have the same obligation to file proposed findings and conclusions.

III. Function of Atomic Safety and Licensing Boards

In considering the substance of the numerous and broad-reaching exceptions which are before us, we first discuss an issue which is directly raised by two of the Saginaw Intervenors' exceptions, and the thrust of which pervades several others. This issue concerns the scope of the review performed by the Licensing Board.

1. The Saginaw Intervenors contend that the Board should have performed an "independent" review of all safety-associated issues (exception II.C.) and of all issues of an environmental nature (exception IV.A), whether or not the issue had been raised by any of the parties. They assert that the "Commission and the Board have an obligation independently to consider" all issues, both safety related and environmental, "whether contested or uncontested." In addition, with regard to environmental issues, the intervenors insist that the National Environmental Policy Act [13] (NEPA) and the *Calvert Cliffs'* decision [14] impose an obligation on an agency to "consider environmental values at each *stage* in the administrative process" and that the agency's sole designee for this purpose is the Licensing Board.[15]

As we understand it, the intervenors would have the Licensing Board perform a complete, *de novo* independent review of a license application—completely disregarding the review already undertaken by the regulatory staff. In this connection, they find error in the Licensing Board's having "failed aggressively to take the initiative with respect to the broad range of environmental values inherent in the proposal for the plant." [16] They conclude that

[13] 42 U.S.C. 4321, *et seq.*

[14] *Calvert Cliffs' Coordinating Committee, Inc.* v. *AEC*, 449 F. 2d 1109 (D.C. Cir. 1971).

[15] Saginaw Intervenors' Exceptions, at p. 55.

[16] *Id.*, at p. 56.

> the agency (and, hence, here the Licensing Board) must take the initiative and do its own analysis *even to the point of doing independent research.*[17]

2. As intervenors themselves acknowledge, their view of the function of a licensing board is at odds with that delineated by the AEC Rules of Practice. The Rules in effect at the time of the hearing provided, with respect to contested proceedings such as this one, that the board will resolve controverted issues as well as decide whether the findings requisite to a license authorization should be made, but that with respect to uncontroverted matters, the board is

> neither required nor expected to duplicate the review already performed by the regulatory staff and the ACRS and they are authorized to rely upon the testimony of the regulatory staff and the applicant, and the conclusions of the ACRS, which have not been controverted by any party.[18]

These provisions *permit* a board to accept certain testimony of the staff and applicant, and conclusions of the ACRS, on uncontested issues; although they do not—as the intervenors contend—*direct* a board to do so.[19] It is clear that the Board here in fact rendered an independent analysis not only of contested issues but also of those aspects of the application which it viewed as "new or unusual,"

[17] *Id.*, at p. 57 (emphasis supplied).

[18] 10 CFR Part 2, Appendix A, III.(g)(1). Similar requirements appear in the currently effective rules. 10 CFR Part 2, Appendix A, V.(f)(1), effective August 28, 1972.

[19] It is interesting to observe in this connection that the Saginaw Intervenors themselves, in their exception II I., fault the Licensing Board for allegedly *failing* to rely on the ACRS conclusions in noncontroverted safety areas—and thus, by inference, for acting independently. However, as we have seen, the regulations permit but do not require reliance on ACRS conclusions on uncontested matters.

whether or not contested.[20] In doing so, it conformed to the standards imposed by the Rules of Practice.[21]

3. A licensing board in a construction permit proceeding such as this is expected to evaluate independently and resolve the appropriate contentions of the various parties, to assure itself that the regulatory staff's review has been adequate, and to inquire further into areas where it may perceive problems or find a need for elaboration. If it finds itself not satisfied with the adequacy or completeness of the staff review, or of the evidence presented in support of the license application, it may, for example, reject the application, or may require further development of the record to support such application. In that connection, it may issue an order which in effect requires one or more of the parties to perform additional research. But for the Board to duplicate the role of the staff, or for it to perform independent basic research, is inconsistent with its adjudicatory role and beyond the scope of its delegated authority.

The intervenors have not brought to our attention any authority—and we are not independently aware of any—which would require the licensing board or other trier of fact in a construction permit proceeding to extend the scope of review contemplated under Commission regulations. In the environmental area, the *Calvert Cliffs'* decision, which is cited by the intervenors, made it clear that NEPA requires the Commission and other agencies "to *consider* environmental issues just as they consider other matters within their mandates."[22] The court did go on to

[20] Initial Decision, par. 11.

[21] Intervenors concede that the Licensing Board followed these standards, but they challenge the legality of those standards. (Saginaw Intervenors' Exceptions, at pp. 15-16, 58.) While it does not appear that this challenge was advanced below in accordance with the then applicable so-called *Calvert Cliffs doctrine*, we consider it on the merits, *infra* pp. 335-336. [Pp. 194-196 this appendix.]

[22] *Calvert Cliffs' Coordinating Committee, Inc.* v. *AEC, supra,* at p. 1112.

set forth its oft-quoted pronouncement that the Commission could not "simply • • • sit back, like an umpire, and resolve adversary contentions at the hearing • • •."[23] But that observation was prompted by then-existing AEC regulations which, among other things, precluded a board in a construction permit hearing from considering environmental matters unless they were raised as contested issues, even though the same board was permitted to consider radiological safety issues, whether or not contested. Far different regulatory requirements are governing here, which impose no such prohibition on a board's consideration of environmental matters.[24] Under these requirements, the Board in this proceeding considered certain environmental matters on its own initiative. *E.g.,* Tr. 7368-7542, 7556-72.

In sum, *Calvert Cliffs',* as well as the other cases cited by intervenors, require no independent research by the Board; moreover, they do not require the Board to duplicate the analysis previously performed by the staff. What *Calvert Cliffs'* requires is an "independent review of staff proposals" by the Board,[25] and conclusions independently arrived at on the basis of evidence in the record, including the staff's Final Environmental Statement.[26] The Board

[23] *Id.,* at pp. 1118-19.

[24] 10 CFR Part 50, Appendix D, as revised September 9, 1971 (36 *F.R.* 18071).

[25] *Calvert Cliffs' Coordinating Committee, Inc.,* v. *AEC, supra,* at p. 1118.

[26] *Greene County Planning Board* v. *FPC,* 455 F. 2d 412 (2d Cir. 1972), also cited by intervenors, invalidated FPC procedures which permitted the holding of a final hearing prior to the preparation of any environmental statement by the agency. The court held that the agency's statement must be considered at such a hearing. Here, the agency's final environmental statement was considered. The *Greene County* court specifically sanctioned the procedural requirement of AEC regulations (at p. 422).

performed that review in this case. Exceptions II.C and IV.A. are accordingly rejected.

IV. Limitation of Issues

Several of the exceptions of the Saginaw Intervenors take issue with various rulings of the Licensing Board which precluded them from raising, and presenting evidence and conducting cross-examination concerning, certain specified issues. In this portion of the decision we shall deal with these contentions *seriatim.*[27]

1. In exception II. B., the Saginaw Intervenors challenge the rulings of the Licensing Board which sustained the applicant's objections to answering two interrogatories (numbers 92 and 210) which had been propounded to it by the intervenors.[28] The exception asserts that, by upholding these objections, the Board "ruled that reactor pressure vessel failure and the probability of such failure were not issues in the proceeding" and "prevented the intervenors from raising a valid issue in the proceeding." [29] The intervenors further claim that such ruling foreclosed them "from securing information in order to make any showing of special circumstances." [30]

We disagree. Neither of the interrogatories called for an evaluation of the possibility or probability of pressure vessel failure. Rather, they *assumed* pressure vessel failure and called upon the applicant to describe and analyze potential consequences thereof. Thus, interrogatory 92 sought

---

[27] Contentions that the Licensing Board did not permit intervenors to litigate certain ECCS issues are dealt with separately in Part V of this decision, *infra* p. 339. [P. 203 this appendix.]

[28] "First Set of Interrogatories of Certain Intervenors Directed to Consumers Power Co.," dated March 22, 1971.

[29] Saginaw Intervenors' Exceptions, at p. 10.

[30] *Id.*, at p. 11.

an analysis of the consequences of a situation in which a simultaneous loss-of-coolant accident and pressure vessel fracture were hypothesized. Interrogatory 210 was apparently directed to an analysis of the consequences of a situation where multiple failures of independent engineered safeguards were assumed—a situation comparable to that which was the subject of contention in the *Point Beach 2* proceeding which we specifically ruled did not raise the question of the likelihood or probability of a sudden pressure vessel rupture. ALAB-80.[13]

The Licensing Board itself obviously viewed the interrogatories in the context of an analysis of the consequences of rupture, since it sustained objections to each of them on the ground that

> the questions call for *analysis of the consequences* of an accident which if found to be a credible accident would require denial of the construction permit.[32]

The Commission has held that the issue of pressure vessel failure is not automatically to be considered in a licensing proceeding. In its Memorandum and Order in the *Indian Point 2* proceeding,[33] which the intervenors invoke as a basis for their contention that pressure vessel rupture is an appropriate issue for this proceeding, the Commission indicated that the probability of a rupture of the pressure vessel is so low that it becomes an appropriate area of inquiry in a licensing proceeding only upon a showing of "special circumstances." A showing of "special circumstances" requires more than a mere allegation thereof;

---

[31] *Wisconsin Electric Power Co., et al.*, ALAB-80, WASH-1218 (Suppl. 1) 544 (Nov. 14, 1972).

[32] "Rulings with respect to objections to interrogatories," dated May 13, 1971, at pp. 1, 2 (emphasis supplied).

[33] *In the Matter of Consolidated Edison Co. of New York* (Indian Point Unit No. 2), Docket No. 50-247, Commission Memorandum and Order dated October 26, 1972.

and a Board is authorized to exclude contentions or challenges "which have no substantial or *prima facie* basis."[34]

Intervenors have made no showing of special circumstances which would warrant the Boad's consideration of the issue of pressure vessel rupture. Moreover, as we have seen, intervenors' interrogatories 92 and 210 were not designed to elicit inforamtion concerning special circumstances; their denial thus could not have the effect of foreclosing intervenors from securing such information. Therefore, intervenors' assertion that they were improperly denied discovery which would enable them to determine whether "special circumstances" exist is patently without merit.

Intervenors exception II. B. is accordingly denied.

2. In exception II. L. the Saginaw Intervenors contend that the Licensing Board "unlawfully" restricted inquiry (by denying the issuance of subpoenas) on the designs of vendors in competition with Babcock & Wilcox, Inc., the vendor of the reactor in this proceeding. They urge that the Commission is ignoring its health and safety responsibilities by (1) granting proprietary protection to certain information furnished by the applicant and vendor, and (2) "refusing to make comparisons between competing nuclear safety systems." They specifically cite the Board's refusal to issue subpoenas for certain Westinghouse information regarding reagent spray systems, and our affirmance of that ruling in ALAB-35.[35]

The views which we expressed in ALAB-35 are dispositive of the issues raised in this exception, and we find nothing in this exception or in the record of this proceeding which would cause us to modify those views. Exception II. L. is accordingly denied.

---

[34] *Id.*, at p. 4, fn. 5.

[35] ALAB-35, WASH-1218 241 (Sept. 21, 1971).

3. In exception II. D., the Saginaw Intervenors assert that the Licensing Board denied them due process by restricting their right of cross-examination. They contend that the Board "in effect" adopted a "rule" that had been suggested by the applicant, which precluded the intervenors from conducting cross-examination "unless they make a *prima facie* showing and were prepared to submit direct evidence" on the invalidity of the information to which cross-examination was directed.[36] Intervenors claim that they were thereby deprived of rights guaranteed them by the Administrative Procedure Act and the Commission's Rules of Practice.

The Board adopted no such "rule." Rather it stated:

> The Board has rejected [applicant's counsel's] request to permit no cross-examination until an affirmative case is established on particular points, and the Board was continue to reject [applicant's counsel's] argument if it is advanced. It seems to us better to take each issue as it comes up and to decide in connection with each issue whether it is one in which we think the process can be fruitful.[37]

On this basis, the Licensing Board permitted extensive cross-examination on the 50% halogen release assumption (from TID-14844) used by the staff, to which exception II. D. is addressed. Only when the Board found that no further repetitive cross-examination would be useful did it limit it by requiring some affirmative showing as a basis for the continuation of such cross-examination.

While opportunity for reasonable cross-examination is provided by the Administrative Procedure Act and the Commission's Rules of Practice, there is no right to un-

---

[36] Saginaw Intervenors' Exceptions, p. 17.

[37] Tr. 1894.

limited cross-examination. A party is only entitled to conduct "such cross-examination as may be required for a full and true disclosure of the facts."[38] And presiding officers or licensing boards are specifically authorized to "regulate the course of the hearing."[39] As is made clear by the legislative history of the Administrative Procedure Act, presiding officers are called upon

> to make the necessary initial determination whether the cross-examination is pressed to unreasonable lengths by a party or whether it is required for the "full and true disclosure of the facts * * *".[40]

The Licensing Board made that determination with respect, *inter alia*, to the cross-examination on the 50% halogen release assumption. In our opinion, it did not abuse its discretion in that regard. Exception II. D. is accordingly denied.

4. Equally without merit are several exceptions contending in essence that the Licensing Board improperly placed the burden of proof on the intervenors to show the plant should not be built.

a. In exception II. E. the Saginaw Intervenors recite the applicable regulations which require a license applicant to assume the burden of proof to establish his entitlement to a license.[41] The intervenors then refer to the matter of the alleged limitation on cross-examination with which we have just dealt, as well as to several statements of the Licensing

---

[38] 5 U.S.C. 556(d); 10 CFR § 2.743(a).

[39] 5 U.S.C. 556(c)(5); 10 CFR § 2.718(e). See *International Harvester Co.* v. *Ruckelshaus*, —F. 2d—, slip opinion p. 22 (D. C. Cir. February 10, 1973).

[40] Administrative Procedure Act—Legislative History, S. Doc. 248, 79th Cong., 2d Sess., at p. 271.

[41] 10 CFR § 10.732.

Board which purportedly reflect a "shift [of] the initial burden of challenge to Intervenors."[42]

Specifically, intervenors quote Dr. Hall as stating that they "have to convince" the Board that "it [the reactor] is improper."[43] But they fail to perceive that, in context, Dr. Hall was merely stating the obvious proposition that each party to the proceeding had the responsibility, if it were to prevail, of convincing the Board of the merit of its contentions.

Similarly, the intervenors refer to what they characterize as a Board "ruling * * * that the Regulatory Staff's submissions are *prima facie* reasonable unless rebutted by intervenors."[44] However, the Board's statement was made in the course of a discussion of whether, and with what quantum of proof, an intervenor could "challenge the whole development of AEC regulations and standards as applied to reactors * * * assumptions which were adopted in 1962 and have been under process of evolution in the period since then."[45] In this limited context, the statement was proper.

The exception is denied.

b. The Saginaw Intervenors also allege an improper shift in the burden of proof in the Board's consideration of environmental issues. Their exception IV. E. states that the Board applied an erroneous burden of proof in assuming that, once a need for electricity has been established, NEPA requires a showing of overriding special environmental damage to offset such need. They assert that the

---

[42] Saginaw Intervenors' Exceptions, p. 19.

[43] Tr. 1048.

[44] Saginaw Intervenors' Exceptions, p. 20. The Board's statement in question appears at Tr. 1893.

[45] Tr. 1890, 1891.

Licensing Board adopted the applicant's conclusions that there was a need for power, "without analyzing the purposes for [which] such assumed electricity would be used;" and, then, required a special showing of environmental damage to outweigh the benefits to be derived from meeting such need. As a result, they contend, the Board engaged in an unlawful weighing of factors in favor of the development of nuclear energy.

To support this exception, the intervenors quote three sentences from the initial decision. But the sentences are taken out of context and, in our opinion, do not support the proposition for which they are cited.

In its environmental review and balancing, the Board identified and discussed both benefits and costs and finally concluded that the "benefits outweigh the costs." It was in this context of its discussion of the extensive evidence on this record purporting to establish a need for the facility that the Board made its statement that "special environmental damage" must be shown to outweigh the evidence of need shown on this particular record. Similarly, the Board's statement that there is no way in which the loss of flora and fauna "in a site of this kind" can outweigh the benefits of supplying the need was the result of its balance of the loss of flora and fauna from a vacant lot in an industrial area against the benefits of meeting the need for electricity, as indicated by evidence of record.

Finally, the Board's statement that a judgment has been made in the Atomic Energy Act that atomic energy "must" be used for production of electricity was made in the context of a discussion evaluating the environmental effects of low-level radioactive discharges, and the claim that plants should not be licensed until all of those effects are ascertained. In that context, we believe that the statement should be interpreted to mean that the Commission must exercise its licensing authority if all applicable requirements which are prerequisites to the exercise of that au-

thority (environmental as well as radiological) have been satisfied.[46]

In context, there is nothing in these statements which represents a lack of regard for environmental values. Indeed, they represent only one aspect of the Board's evaluation and balancing of environmental considerations. To be sure, the intervenors may question the balance reached by the Board, but we see nothing to indicate that the Board applied an incorrect burden of proof as to environmental issues. And as will be seen later, the Board correctly declined to evaluate the particular uses that would be made of the electricity produced, although it did find that the postulated demand would be made up of normal industrial and residential use.[47] Accordingly, exception IV.E. is denied.[48]

V. ECCS Issues

The exceptions of both the Saginaw and Mapleton Intervenors raise questions concerning the reactor emergency core cooling system (ECCS). In general, these exceptions fall into two general types: those challenging the validity of the Commission's ECCS Criteria,[49] and those challenging the conformance of the Midland ECCS to those Criteria.[50]

---

[46] Viewed in this manner, the statement negates the contentions made in Saginaw Intervenors' exception VI. C.

[47] See Part XI. 3.a of this decision, *infra*. p. 351. [P. 236 this appendix.]

[48] The burden-of-proof question has also been raised in Exception III. E, as part of a discussion of the Board's handling of the synergism issue. We will deal with all aspects of the synergism issue in Part VIII of this decision, *infra*, pp. 344-345. [Pp. 216-220 this appendix.]

[49] Saginaw Intervenors' exceptions II. J. and III. A., and Mapleton Intervenors' exception 4.

[50] Saginaw Intervenors' exception III. B.

We have already held that a licensing board may not entertain an attack upon the Interim Acceptance Criteria. The only question that may be litigated in an individual licensing proceeding is whether the ECCS of the reactor in issue conforms to those Criteria.[51]

As for the conformance of the Midland ECCS to the Interim Criteria, the Saginaw Intervenors, in exception III. B., contend that the applicant "has not submitted evidence in order to meet Criteria Nos. 3 and 4 of the Interim Acceptance Criteria." They reason that our prior ruling in ALAB-46, *supra,* requires only that an applicant demonstrate conformance to the appropriate evaluation model; that this ruling is in error; and that a computation pursuant to the evaluation models does not necessarily demonstrate compliance with these Criteria.

Since, as the Licensing Board explicitly found, the intervenors did not contest below the compliance of the proposed reactor with the Interim Criteria,[52] there is no necessity for us to entertain these assertion. In any event, we note that the identical assertions were recently made and rejected by us in the *Indian Point 2* proceeding.[53] We adhere to the reasons there assigned for that rejection.

---

[51] *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-57, WASH-1218 435 (June 20, 1972); *Wisconsin Electric Power Co., et al.* (Point Beach Nuclear Plant, Unit 2), ALAB-78, WASH-1218 (Suppl. 1) 517, 523-24 (November 10, 1972); *Boston Edison Co.* (Pilgrim Nuclear Power Station), ALAB-83, WASH-1218 (Suppl. 1) 552 (December 4, 1972). See also *Consolidated Edison Co.* (Indian Point Unit No. 2), ALAB-46, WASH-1218 293 (March 10, 1972); *Baltimore Gas & Electric Co.,* Docket Nos. 50-317 and 50-318, Commission Memorandum and Order dated September 13, 1972, at p. 3.

[52] Initial Decision, par. 40.

[53] *Consolidated Edison Co.* (Indian Point Unit No. 2), ALAB-95, RAI-73-1 33 (January 18, 1973).

VI. Limitation of Intervenors' Discovery

Certain of the exceptions filed by both groups of intervenors challenge the extent of discovery which the intervenors were accorded under various rulings of the Licensing Board and, on one occasion, by one of our decisions.[54]

1. Exception II. A. of the Saginaw Intervenors questions the Licensing Board's rulings disallowing certain interrogatories addressed by the intervenors to the staff and the Commission's Advisory Committee on Reactor Safeguards (ACRS). Exception II. N. has a somewhat similar thrust, questioning the rulings of the Licensing Board as well as our own ruling (ALAB-33)[55] disallowing certain of the intervenors' document requests. Since both of these exceptions bear to some extent upon the appropriate role of the ACRS in a proceeding such as this, we will also take this opportunity to consider two other exceptions (II. H. and I.) pertaining to the reports of the ACRS on the Midland reactors.

a. Section 182b of the Atomic Energy Act, 42 U.S.C. 2232(b), directs the ACRS to review each construction permit or operating license application, and to submit a report thereon "which shall be made part of the record of the application and available to the public" (with limited exceptions not here relevant). The ACRS letter is only admitted as part of the record to show compliance with statutory requirements and not for the truth of any of the statements therein.[56] However, the AEC Rules of Practice

---

[54] The alleged limitations which we here discuss are those occasioned by the nature of the information requested or the identity of the person or persons from whom such information was sought, and do not include those arising as a result of the exclusion of issues which the intervenors sought to inject into this proceeding. For a discussion of some of these issues, see Parts IV and V of this decision, *supra.*

[55] ALAB-33, WASH-1218 225 (September 3, 1971).

[56] *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant,

provide that in uncontested cases, and in contested cases with respect to issues which are not controverted by any party a licensing board may rely on the "conclusions of the ACRS."[57]

b. In exception II. A. the Saginaw Intervenors claim they were denied "due process" by the failure of the Licensing Board to require the Regulatory Staff or the ACRS to answer interrogatories directed to both radiological and environmental issues.

The Licensing Board in fact directed the staff to answer many interrogatories but sustained objections to others, principally on the ground of undue burden.[58] The Board also noted that many of the interrogatoies directed at the staff were not propounded to seek facts but, rather, to inquire into the thought processes of the staff and its rationale for reaching certain decisions. Thus, the Board stated:

> It is perhaps not an exaggeration to say that complete answers to these interrogatories would require the staff to prepare a justification, intelligible to laymen, of the whole history of the development of pressurized water reactors * * * [59]

Moreover, in rejecting interrogatories on environmental matters, the Board took into account that many of those

---

Unit 2), ALAB-78, WASH-1218 (Suppl. 1) 517, 527 (November 10, 1972); *Arkansas Power and Light Co.* (Arkansas Nuclear One, Unit 2), ALAB-94, RAI-73-1 25 (January 18, 1973).

[57] 10 CFR Part 2, Appendix A, III(g) (regulations in effect prior to August 28, 1972); similar requirements now appear in Part 2, Appendix A, V(f)(1) and (2).

[58] ASLB telegrams of May 13 and May 27, 1971, and "Rulings on Interrogatories Addressed to the AEC Staff," dated June 1, 1971. See also Tr. 1879.

[59] June 1, 1971 "Rulings," at pp. 2-3.

interrogatories were simply resubmissions of interrogatories previously disallowed, and that the intervenors had failed to show why the earlier rulings no longer prevailed.[60]

Under 10 CFR § 2.718, the Board has broad discretionary authority to confine discovery within reasonable limits. Absent an abuse of discretion affecting substantial rights of a party, a board's rulings will not be disturbed.[61] We find no such abuse of discretion here.

c. The major emphasis in exception II. A. is upon the Licensing Board's denial of all interrogatories directed to the ACRS. We have previously stressed, in holding that an ACRS report could not be admitted into evidence for the truth of the matters stated therein, that the "persons responsible for the report (the members of the ACRS) are not subject to being examined by the parties or the Board" with reference to the contents of the report.[62] That being so, the denial of all of the intervenors' interrogatories directed to the ACRS was plainly correct.[63]

---

[60] "Order With Respect to Various Motions Filed in this Proceeding," dated December 22, 1971, p. 16.

[61] *Cf. Bell* v. *Swift & Co.*, 283 F. 2d 407, 409 (5th Cir. 1960).

[62] *Arkansas Power and Light Co.* (Arkansas Nuclear One Unit 2), ALAB-94, *supra*, at p. 32, citing a Commission order of January 26, 1972 in the ECCS rulemaking proceeding, Docket No. RM-50-1.

[63] Exception II. H. of the Saginaw Intervenors represents another view of the same issue. It challenges the admission into evidence of the report and letter of the ACRS without according the intervenors an opportunity to question the truth, validity or authenticity of the statements made therein. Since the documents were not admitted for the truth of the matters stated therein but "for the sole purpose of showing compliance with the statute" (Initial Decision, par. 1, fn. 2; Tr. 1881-2, 1895), the manner in which the ACRS arrived at the views which it expressed is irrelevant here. Discovery thereon is not required. Moreover, the instances which intervenors cite as showing substantive reliance by the Licensing Board on ACRS statements are misplaced; they either do not mention or

2. Exception II. N. raises a similar question regarding the propriety of the Licensing Board's denial of document discovery against the ACRS. For reasons indicated above, such discovery is not available under existing Commission procedures. The Licensing Board committed no error.

Exception II. N. also objects to our ruling in ALAB-33[64] concerning the discovery of privileged documents. Since no valid reason for us to change that ruling has been set forth, we decline to do so.

VII. Suitability of the Midland Site

Several of the Saginaw Intervenors' exceptions relate to the suitability of the Midland plant site for its intended use, both from a safety and an environmental standpoint. In our opinion, none of these exceptions is meritorious.

1. Exception III. D. asserts that there is no basis in the record for the Licensing Board's finding that the requirements of 10 CFR Part 100 have been satisfied. The intervenors advance two independent bases for this contention.

First, they insist that Part 100 incorporates, as a guide, T.I.D. 14844;[65] that if an applicant does not wish to follow T.I.D. 14844, it must demonstrate the applicability of alternative criteria; and that the applicant and staff, in asserting that the Midland application satisfied the requirements of Part 100, relied on Safety Guide 4 rather than T.I.D.

---

concern the ACRS, or reflect the Licensing Board's ruling limiting its reliance upon the ACRS report to establishing that the statutory directions appearing in Section 182b, of the Atomic Energy Act had been satisfied. In our view, the Licensing Board did not assign any independent probative value to any statements in the ACRS report.

[64] ALAB-33, WASH-1218 225 (September 3, 1971).

[65] "Calculation of Distance Factors for Power and Test Reactor Sites," dated March 23, 1962.

14844 without providing an adequate justification. Intervenors add that had T.I.D. 14844 been used, the Midland site would have been found "unacceptable."[66]

Secondly, the intervenors contend that the Licensing Board's judgment as to site acceptability was conditioned on its finding that the emergency plans met the requirements of 10 CFR Part 50, Appendix E; and that the evidence of record provides "no support" for such a finding. Intervenors argue that the Board was required not only to determine that an adequate plan existed but also that it was workable; and that, absent such a determination, the Licensing Board had no basis for concluding that the Midland site was suitable.

a. Turning first to the question of the general criteria which the applicant has utilized to establish its compliance with 10 CFR Part 100 ("Reactor Site Criteria"), the intervenors appear to read Part 100 as a completely frozen statement of exact procedures to be followed for the evaluation of reactor sites. On the theory that the procedural methods and site calculations developed in T.I.D. 14844 have been incorporated by reference into Part 100, they reason that the record must at least adequately demonstrate a valid reason for deviating from those procedures and calculations. Finding such a deviation in the applicant's and staff's admitted reliance on Safety Guide 4—which, among other things, sanctions a Board's consideration for site evaluation purposes of engineered safeguards such as emergency core cooling systems—the intervenors assert that the record fails to demonstrate the reliability of engineered safeguards and hence fails to provide an adequate basis for the Board to rely on Safety Guide 4.

This argument ignores 10 CFR § 100.10, which in describing various factors which the Commission will take into account in evaluating site acceptability, specifically

---

[66] Saginaw Intervenors' Exceptions, p. 53-12.

sanctions the consideration of, *inter alia,* "safety features that are to be engineered into the facility." 10 CFR § 100.10(a)(4). It also ignores the actual content of Safety Guide 4. It is true that Part 100 provides (in a footnote) that T.I.D. 14844 *may* be used for guidance and that the calculations in that document *may* be used as a point of departure for consideration of particular site requirements. But the basic requirements of paragraphs 1a, 1b and 1c of Safety Guide 4 (which intervenors claim has been improperly substituted for T.I.D. 14844) are essentially the same as those in T.I.D. 14844. Paragraph I d of Safety Guide 4 merely permits the applicant to take credit for the reduction in the amount of radioactive material available for leakage due to containment sprays, filter systems and other engineered safety features—a provision clearly consistent with 10 CFR § 100.10(a). Paragraph 1e of Safety Guide 4 is slightly different from assumption 4 of T.I.D. 14844, in that the rate of leakage from the containment is reduced after 24 hours because of the decrease in pressure in the containment; but, again, this provision is consistent with 10 CFR § 100.10(a).

Not only is it consistent with Part 100 for a board to take account of engineered safeguards such as an emergency core cooling system, but there is also no requirement that there be a demonstration on the record of the effectiveness of such a system—assuming, of course, that applicable criteria have been established and that the system complies with such criteria. If an ECCS meets such criteria, "the Commission has judged it to be acceptable." [67] The Licensing Board found conformance of the Midland ECCS with applicable criteria,[68] and we have earlier (Part V, *supra*) rejected the Saginaw Intervenors' exception on

---

[67] *Consolidated Edison Co.* (Indian Point No. 2), ALAB-46, WASH-1218 293, 302 (March 10, 1972).

[68] Initial Decision, par. 40.

that issue. Accordingly, it was appropriate for the Licensing Board to take into account the emergency core cooling system in its determination that the plant conformed to the requirements of Part 100.

Intervenors also object to what they describe as one of the assumptions of both T.I.D. 14844 and Safety Guide 4—that the fission product release contemplated by those documents is conservative only if the ECCS is "almost or 100% effective." They contend that

> [o]nly pursuant to such an assumption can one say that an abitrary release of fission products less than the total fission inventory of the core is conservative.[69]

This contention derives no support from the record, which clearly shows (Tr. 1867-8) that the amount of radioactive releases from the core used in T.I.D. 14844 calculations assumes essentially 100% meltdown of the core. It is only under conditions of complete failure of the ECCS that such a complete meltdown might possibly occur. The fission-release values are therefore conservative even under partial operation of the ECCS. While the intervenors disagree with this, they did not produce any contrary evidence in spite of an invitation by the Board for them to do so. (Tr. 1890-93). Accordingly, we find no reason to find fault with the Board's utilization of the guidelines of Safety Guide 4 in its determination regarding conformance to Part 100, or to upset its findings regarding site suitability under Part 100 which are premised upon the criteria of Safety Guide 4.[70]

---

[69] Saginaw Intervenors' Exceptions, p. 53-15.

[70] Intervenors further claim in this regard that the Licensing Board was uninterested in the whole concept of the safety of the people in the Midland community. Neither the pages of the transcript quoted by the intervenors (Tr. 1679-1887 and Tr. 1610-1667) nor any other part of the record discloses any indication of any such disinterest by the Board.

b. The second aspect of intervenors' challenge to the Part 100 findings evolves from the Board's acceptance of the applicant's proposed emergency evacuation plan. The Board considered the evaluation plan not only from the standpoint of whether it satisfied the requirements of 10 CFR Part 10, Appendix E ("Emergency Plans for Production and Utilization Facilities") but also as an element in satisfying the requirements of Part 100. Thus, it found that the residential population within the low population zone is "well within acceptable limits," as defined by Part 100; but that the transient population within such zone—primarily employees of Dow—is "unusually large" and acceptable under Part 100 only on the assumption of an effective evacuation plan.[71]

With respect to the plan itself, the Licensing Board noted that it had given particular consideration to the evacuation procedures of Dow. The Board had found a plan which had been initially proposed, and which had been developed prior to the promulgation of Appendix E to be "inadequate," and had required the applicant to submit a revised plan. The Board ruled that the revised plan conforms to the requirements of Appendix E.[72]

In making its determination regarding conformance of the plan with both Appendix E and Part 100, the Licensing Board interpreted the regulations as requiring only a discussion of preliminary plans "sufficient * * * to assure the compatibility of proposed emergency plans" with the plant location, and not "specific proposals."[73] Specifically discounting the testimony of a witness of Saginaw Intervenors, the Board found that "timely evacuation is reasonably assured."[74]

---

[71] Initial Decision, par. 16.

[72] *Id.*, par. 33.

[73] *Id.*, par. 32.

[74] *Id.*, par. 33.

The Saginaw Intervenors question the legal test adopted by the Licensing Board in this regard; they claim that the Board was required to investigate and make findings regarding the workability of the plan. Their argument is somewhat analogous to that which they made—and which we accepted—with regard to the quality assurance (QA) plan under consideration in this proceeding. See ALAB-106.[75] But QA plans and emergency evacuation plans are not at all comparable and the respective regulatory requirements differ substantially. We held in ALAB-106 that at least in certain situations a licensing board at the construction permit stage must look into the workability of QA plans; those plans are used during the plant's construction and are a vital component of the Commission's safety program applicable to such construction. In contrast, emergency evacuation plans play no such role during construction, and the requirements of Appendix E recognize that fact.[76]

In their challenge to the Board's findings concerning the emergency plan, the intervenors cite both Sections II and IV of Appendix E as the sources of the rules applicable in this proceeding. Our review of the initial decision convinces us that the Board correctly applied the criteria of Section II, which govern plans at the construction permit stage; and that it was not required to apply the criteria of Section IV, which deal with the content of plans to be submitted at the operating-license stage in the Final Safety Analysis Report.

Intervenors also claim that the Board erroneously disregarded testimony of the witness that it was impossible to evacuate either the low population zone or the City of Midland in the time required by the regulations. The regulations required a showing of the possibility of evacuation

---

[75] RAI-73-3 182 (March 26, 1973).

[76] 10 CFR Part 50, Appendix E, Sections II, III and IV.

only from the low population zone,"[77] and only one outlying area of the City of Midland (primarily occupied by Dow) falls within that zone. There is ample evidence of record which indicates that evacuation of the low population zone within the requisite time period is feasible."[78] Accordingly, there was warrant for the Board's findings on this subject.

2. Mapleton Intervenors' exception 2 is directed to the Board's finding that the residential population in the low population zone is "within acceptable limits."[79] These intervenors claim that this finding was made without any reference either to the criteria aplied to determine what limits are acceptable, or to the justification for those criteria.

We note first that Mapleton Intervenors failed to raise below an issue concerning the residential population of the low population zone and hence should not be permitted to raise it before us. On the merits, however, it is obvious from the initial decision that the Licensing Board, as it was required to do, evaluated the residential population of the low population zone in accordance with the criteria in 10 CFR § 100.3(b). Moreover, the record adequately supports the acceptability of the low population zone.[80] This exception is denied.

3. Saginaw Intervenors' contention IV.J. asserts that, in the environmental phase of the initial decision, the

[77] 10 CFR § 100.3.

[78] See, e.g., Tr. 2604-15, 2664-83, 3096-3266, 3282, 3286-7, 3397-3400. Intervenors assert that their witness testified that it would take "at least four hours to evacuate Dow." Exceptions p. 53-19. In fact, their witness testified not that it would take "at least four hours" to evacuate Dow but, rather, that he estimated "that it would take two-and-a-half to four hours." (Tr. 4775).

[79] Initial Decision, par. 16. See further discussion *supra*, p. 342. [P. 212 this appendix.]

[80] See, *e.g.*, Tr. 1674, 3295, 3339-40, 3371-72, 3398-3400.

Board should have analyzed the adequacy of Part 100 and of Appendix E to Part 50. The intervenors base this contention on the "peculiar circumstances of the site" which, they contend, require an analysis from an environmental standpoint of whether "mere compliance with those regulations was sufficient."[81]

The Board applied the criteria of Part 100 and of Appendix E only in the context of its health and safety responsibilities. It independently evaluated the environmental aspects of the plant, taking into account the particular site characteristics, as well as applicable Commission guidelines. Thus, various accidents were individually analyzed, in the manner outlined in the September 1, 1971 letter of the AEC Director of Regulation to applicants,[82] and the potential releases of such accidents and the probabilities of their occurrence evaluated in making a judgment as to their environmental effect.[83]

Intervenors specifically refer to the lack of cost-benefit analysis of an individual's exposure to a 300 rem dose to the thyroid, as the result of an accident. Footnote 2 to 10 CFR 100.11, which is addressed to the 25 rem whole-body dose to a person situated at the boundary of the *exclusion* area, expressly states that "[h]owever neither [the use of the 25 rem] value nor that of the 300 rem value for thyroid exposure as set forth in these site criteria guides are intended to imply that these numbers constitute acceptable limits for emergency doses to the public under accident conditions." We emphasize again that 10 CFR Part 100 is to be used for the evaluation of proposed sites

[81] Saginaw Intervenors' Exceptions, p. 96a.

[82] "Scope of Applicant's Environmental Reports with Respect to • • • Accidents," dated September 1, 1971. Use of this document has been explicitly sanctioned. See 36 *F.R.* 22851 (December 1, 1971).

[83] Initial Decision, pars. 67, 74.

and not to set individual limits of exposure to radioactivity.

Apart from these considerations, the Board did in fact deal with the environmental aspects of the hypothetical accidents contemplated by Part 100, finding the possibility of such an accident to be "vanishingly small" and "their environmental risk • • • extremely low." [84]

Accordingly, this exception is without merit.[85]

VIII. Synergism

One of the major contested issues in this proceeding is the claimed "synergistic" interaction of releases of radioactivity with chemicals released from the Dow plant. The Saginaw and Mapleton intervenors each asserted, with respect both to the radiological and environmental aspects of the proceeding, that the combination of radioactive and chemical effluents would produce a synergistic effect which is greater than the sum of the separate effects. The Saginaw Intervenors through discovery obtained from Dow a list of effluents expected to be discharged from the Dow facility in 1975, the year the Midland plant was originally scheduled to begin operation.[86] Nevertheless, they produced no evidence in support of their contentions respecting synergism. The Mapleton Intervenors, however, presented three witnesses on this subject.

[84] Initial Decision, pars. 67, 74.

[85] Saginaw Intervenors' Exception IV.F. makes a somewhat similar contention applicable to safety regulations generally, asserting that the Board relied on such regulations but failed to undertake a cost-benefit analysis for each one of them. As in the case of Part 100 and of Part 50, Appendix E, which we have heretofore discussed, the Board applied various safety criteria only in the context of its health and safety responsibilities. It independently evaluated the environmental aspects of the plant, taking into account its predicted environmental effect. For example, with respect to permissible radiation releases (to which intervenors specifically refer), the Board analyzed the environmental impact of releases, on the assumption that they will meet the "as low as practicable" criteria which will be set up by Part 50, Appendix I, when it is finally approved. Such review conforms to the mandates of NEPA. Exception IV. F. must also, therefore, be denied.

The Licensing Board found that, standing alone, the intervenors' evidence failed to establish "that, at the levels of concentration involved here, there will be any interaction which would tend to increase radiation effects from the Plant, or the chemical effects from Dow." [87] Considered in light of the evidence presented by the applicant and staff, the Board found the evidence against a finding of "synergism" to be "overwhelming."

a. In exception III. E., the Saginaw Intervenors begin their discussion of the synergism issue by stating that this issue was considered only as a result of the effort of the intervenors; but that despite those efforts, the Licensing Board failed to treat it adequately. They concede that the Board started an inquiry on synergism but claim that it "never really followed through." [88]

The record does not support this claim. The technical members of the Board, in particular, on several occasions directed a number of penetrating questions respecting synergism to the staff (*e.g.*, Tr. 7557), the applicant (*e.g.*, Tr. 8905) and the intervenors (*e.g.*, Tr. 8266-267, 8469, 8514-15). In this regard, the Board adequately carried out a licensing board's responsibilities. See pp. 12—17, *supra*.

b. The apparent thrust of exception III.E. is that the evidence (presented by the Mapleton Intervenors) on synergism was sufficient to constitute a *prima facie* showing

[86] Initial Decision, par. 65.

[87] Initial Decision, par. 66.

[88] Saginaw Intervenors' Exceptions, p. 53-22.

of the "invalidity" of the standards imposed by Parts 20 and 100 of the Commission's regulations. Accordingly, so the intervenors argue, the Licensing Board should have certified the question of the validity of these regulations to this Board or, at least, "'sufficiently analyzed its implications.'"[89]

Certification to us would have been required, under procedures then in effect, only if the Licensing Board concluded that "there is a substantial question presented on the record as to the validity of a challenged regulation."[90] From our review of the initial decision, we perceive no such conclusion on the part of the Licensing Board, particularly as applied to the evidence on synergism. To the contrary, the Board specifically found the intervenors' evidence to be nonpersuasive. We see no reason to upset that finding.

c. The final point on synergism made by the Saginaw Intervenors is that the burden of proof on this issue was "misplaced;" and that the Board required the intervenors to "demonstrate there was a problem of synergism rather than, as is required by the Rules, having Applicant and the Regulatory Staff demonstrate that there is no problem with synergism."[91] Here intervenors misinterpret the requirements of the rules.

The ultimate burden of proof on the question of whether the permit or license should be issued is, of course, upon the applicant. But where, as here, one of the other parties contends that, for a specific reason (in this instance alleged synergism) the permit or license should be denied, that

---

[89] *Id.*, p. 53-23.

[90] *In the Matter of Baltimore Gas and Electric Co.* (Calvert Cliffs Nuclear Power Plant, Units 1 and 2), Docket Nos. 50-317, 50-318, Commission Memorandum dated August 8, 1969, at p. 4.

[91] Saginaw Intervenors' Exceptions, p. 53-23.

party has the *burden of going forward* with evidence to buttress that contention. Once he has introduced sufficient evidence to establish a *prima facie* case, the burden then shifts to the applicant who, as part of his overall burden of proof, must provide a sufficient rebuttal to satisfy the Board that it should reject the contention as a basis for denial of the permit or license. In this case, the Licensing Board determined not only that the intervenors had failed to make a *prima facie* showing of synergistic effects, but also that the applicant's evidence affirmatively established that synergism would not occur.

d. It is unfortunate that, in connection with an issue as contested and as novel as the synergism issue, the Licensing Board's ruling was as cursory as that appearing in paragraphs 64-66 of the initial decision. While the Board did state that, when one considers the testimony of the applicant and staff, the evidence against a finding of "synergism" was "overwhelming," the decision deals specifically only with the inadequacies of the intervenors' testimony. It neglects to include any specific reference to the persuasive evidence on synergism presented by the applicant and staff. The applicant presented three witnesses on this subject (Drs. John H. Rust, Merrill Eisenbud, and G. Hoyt Whipple), including an extensive paper by Dr. Rust (Tr. 8873-8900). The staff presented testimony by Dr. Norman A. Frigerio. These witnesses were subjected to extensive cross-examination (Tr. 8909-8944).

The testimony of these witnesses can perhaps best be summarized in the words of Dr. Rust:

> • • • there is no direct or indirect evidence that will lead to the conclusion that the effluent of either the Dow plant or the Midland nuclear power station will interact in any way to make the very minimal ionizing radiation released or the minimal chemical effluents

expected harmful to man, his ecosystem or the biosphere in general, now or in the future.[92]

The conclusion was reached after an extensive analysis of the characteristics and effects of the various effluent releases, and with regard both to somatic effect and genetic damage.

We regard the views expressed by the staff's and applicant's witness as dispositive on the synergism question, and adequate to support the Licensing Board's ultimate findings on this issue. Saginaw Intervenors' exception III. E. is accordingly denied.

e. The Mapleton Intervenors' questioning of the Board's findings regarding synergism is disposed of by our comments in d., *supra*. With respect to those intervenors' challenge to certain exclusionary evidentiary rulings, only that relating to the affidavit of Dr. Charles Huver is sufficiently identified to be considered. Dr. Huver's affidavit was viewed as a challenge to Part 20 and was excluded on the ground that it did not raise a substantial question as to the validity of Part 20.[93] Dr. Huver was not called upon to testify on synergism, and he was not made available for cross-examination. His affidavit was accordingly not entitled to any evidentiary weight. Mapleton Intervenors' exception 9 is accordingly denied.

IX. Analysis of Hypothetical or Design Basis Accidents

The analysis of hypothetical or design basis accidents is an essential part of the Commission's licensing review procedures, both from a safety and an environmental standpoint. Questions in both areas hase been raised in this pro-

[92] Tr. 8896.

[93] Licensing Board's Order dated March 10, 1972.

ceeding. We will first address the safety questions on this subject, and thereafter the environmental questions.

1. In exception III. C. the Saginaw Intervenors contend that the Licensing Board failed to analyze all of the required accidents associated with design and operation of the proposed plant. They claim that the loss-of-coolant accident (LOCA) analyzed by the applicant and staff, and accepted by the Board, is not the "true credible accident," since the analysis was premised "on the effectiveness of engineered safeguards such as emergency core cooling system as well as upon the integrity of the pressure vessel of the primary coolant system."[94] They read such analysis as being inconsistent with the definition of LOCA.[95]

Intervenors misstate the analysis actually undertaken by the applicant and staff. Rather than assuming operation of the ECCS to prevent core meltdown, as intervenors claim, the hypothetical accident analyzed by both the applicant and staff assumed, in accordance with 10 CFR § 100.11(a), footnote 1, a substantial meltdown of the core with subsequent release of appreciable quantities of fission products.[96] The safety analysis assumed that only one-half of the engineered safeguards are available during the accident.[97]

Exception III. C. includes a further claim that accidents occurring in two other circumstances should have been analyzed; a simultaneous maximum hypothetical accident in both Midland reactors, and a maximum hypothetical accident at one reactor together with the largest credible

[94] Saginaw Intervenors' Exceptions, p. 53-7. The pressure vessel integrity issue was also raised in Exception II. B. and has been disposed of in our discussion of that exception (*supra*, pp. 336-337).

[95] 10 CFR Part 50, Appendix A.

[96] Tr. 1946-50, 1867-8.

[97] Tr. 2320.

chemical incident at the Dow facilities. We assume that the intervenors are referring to simultaneous postulated accidents chosen for 10 CFR Part 100 evaluation purposes. Section 100.11(b) provides that site criteria need only be analyzed with respect to a single accident unless an accident in one reactor would initiate an accident in another, or unless an accident in one reactor could affect the safety of the operation of the other reactor. The Midland reactors are not to be interconnected and there is no showing on the record of this proceeding that an accident in one unit would initiate an accident in the other. Similarly, there has been shown no cause and effect relationship between an accident at Midland and one at Dow. In those circumstances, the simultaneous accidents mentioned by the Saginaw Intervenors need not have been considered by the Licensing Board.[98]

Exception III. C. is accordingly denied in its entirety.

2. Saginaw Intervenors' exception V. A. deals with design basis accidents from the point of review of the Commission's environmental responsibilities. In that respect, the regulations in Appendix D to 10 CFR Part 50 (implementing the requirements of NEPA) have been construed to require, at least since their major restructuring in September, 1971, a discussion in environmental impact statements (and concomitantly consideration at any public hearing) of the environmental impact of certain types of nuclear accidents. By letter dated September 1, 1971,[99] the AEC Director of Regulation issued instructions to all license applicants relative to the manner in which accidents were to be discussed in environmental reports. Nine categories of postulated accidents were established, rang-

[98] See also *Wisconsin Electric Power Co.* (Point Beach, Unit 2), ALAB-31, WASH-1218 201 (August 18, 1971).

[99] "Scope of Applicant's Environmental Reports with Respect to • • • Accidents," *supra.*

ing from the most trivial to the most severe. Class 1 accidents do not have to be considered "because of their trivial consequences." At the other extreme, Class 9 accidents also do not have to be considered; while it was recognized that their consequences "could be severe," it was also concluded that "the probability of their occurrence is so small [as a result of such factors as defense in depth (multiple physical barriers), quality assurance, continued surveillance and testing, and conservative design] that their environmental risk is extremely low." Class 8 accidents are equated with the design basis accidents used in Safety Analysis Reports and Safety Evaluations, but the analysis of their consequences was directed to be on the basis of realistic assumptions rather than the highly conservative assumptions appearing in the safety reports and safety evaluations.

The instructions to applicants in the September 1, 1971 letter concerning consideration of accidents were incorporated into proposed regulations in December, 1971.[100] These regulations require environmental reports to include a discussion of accidents, based on the assumption set forth in an annex to Appendix D which, like the September letter and for the same reasons, requires consideration of all accidents other than those in Class 1 and Class 9. The proposed regulations are entitled to be accorded some weight, in view of an expression in the Statement of Considerations of the Commission's expectation

> that the provisions of the proposed amendments will be useful as interim guidance until such time as the Commission takes further action on them.[101]

[100] 36 *F.R.* 22851 (December 1, 1971). In footnote 2 of the proposed annex, the September letter was recognized as "guidance" on this subject which had been made available to the public.

[101] 36 *F.R.* at p. 22851 (December 1, 1971). In August, 1972, after the close of the environmental hearings in this case, the Com-

The proposed annex to Appendix D, although it does not require consideration of Class 1 or Class 9 accidents, does recognize that "other accident assumptions may be more suitable for individual cases." Accordingly it specifies that

> [w]here assumptions are not specified, or where those specified are deemed unsuitable, assumptions as realistic as the state of knowledge permits shall be used, taking into account the specific design and operational characteristics of the plant under consideration.[102]

In similar fashion, with respect to Class 8 accidents, the proposed regulations provide that environmental reports need not take into account those accidents

> for which the applicant can demonstrate that the probability has been reduced and thereby the calculated risk to the environment made equivalent to that which might be hypothesized for a Class 9 event.[103]

3. In exception V. A. the Saginaw Intervenors challenge the Licensing Board's disposition of questions raised concerning a Class 9 accident. The Board indicated that the applicant had furnished information with respect to potential public exposures to radioactivity from postulated accidents; and that the information had been furnished in accordance with the guidance in the September 1, 1971 letter of the Director of Regulation (which, as we have seen, was substantively incorporated into the December 1,

---

mission issued for comment a draft "Guide to the Preparation of Environmental Reports for Nuclear Power Plants" which, with respect to accidents, incorporated the text of the December 1, 1971 proposals. In March, 1973, following the initial decision here, this guide was issued in final form, incorporating the same guidance with respect to accidents (38 *F.R.* 8013, March 27, 1973.)

[102] *Id.*, at p. 22852.

[103] *Ibid.*

1971 proposed regulations). The Board found, for purposes of the cost-benefit analysis of an individual reactor, that the chances of a serious accident were "vanishingly small," incalculably small," and thus "insubstantial."[104]

This finding—and the related finding in paragraph 67 of the initial decision—are amply supported by evidence of record.[105] In contending otherwise, the intervenors rely on material not part of the record—indeed, material which did not come into being until after the close of hearings in this proceeding. We can, of course, take official notice of new information, and can order a remand to the Board for the consideration of such information if that course of action were necessary or desirable. But a remand is not necessary here because intervenors have misinterpreted the cited portions of the newly discovered information.

They state that "[f]irst of all, the Atomic Energy Commission has recently retreated from its specious argument that the probability of a Class 9 accident is vanishingly small."[106] We know of no such "retreat" and intervenors give no reference to support their statement.

Intervenors further state that " * * * in the Regulatory Staff's NEPA Statement under date of December 8, 1972, and in connection with the ECCS hearings, the Regulatory Staff now admits that there is no statistical basis for a position that the probability of a Class 9 accident is 'vanishingly small'."[107] But what the staff actually said in the December 8 document was quite different (p. 8):

> The conclusions that accidents in this category are sufficiently low in probability that their impact on the

---

[104] Initial Decision, par. 74.

[105] See, *e.g.*, Staff Exh. 6, p. VI-3.

[106] Saginaw Intervenors' Exceptions, p. 100.

[107] *Id.*, pp. 100-101.

environment need not be considered is based on the technical judgment of the AEC staff rather than on statistical methods.

Finally, intervenors quote Safety Report WASH-1250 at page 6-39 [108] as stating "that the probability of a Class 9 accident is ten to the minus three, per year." The actual figure on page 6-39 of this report shows that the (catastrophic failure) or Class 9 accident has a probability of 10^{-6}/yr.

It is on the basis of these three gross misstatements that intervenors conclude that the Licensing Board should have engaged in an independent evaluation of the consequences of a Class 9 accident and that not to do so "is almost criminal negligence." [109] Further, the misstatements underpin their suggestion that the applicant and staff had an obligation to establish on the record the likelihood of a Class 9 accident in view of their "burden of demonstrating the propriety of the proposed [licensing] action." [110]

The regulatory judgments used in the calculation of Class 9 accidents may be accepted as correct by licensing boards absent an affirmative showing that they are not correct. Here, no such showing has been made. That being so, Saginaw Intervenors' exception V.A. is denied.

X. Resolution of Various Safety Items

Saginaw Intervenors' exception II. F. and G., their Motion to Supplement the Record of March 28, 1973, and Mapleton Intervenors' exception 3, all relate to the resolu-

---

[108] Properly identified as "Draft—The Safety of Nuclear Power Reactors (light water cooled) and Related Facilities—WASH-1250." (December, 1972).

[109] Saginaw Intervenors' Exceptions, p. 102.

[110] *Id.*, p. 100.

tion of various safety questions, either generically or with specific reference to this facility. They also concern the function and relationship of various organizational components involved in the licensing review process, such as the regulatory staff, the compliance staff, and the ACRS, as well as the Licensing Board. For these reasons, those exceptions will be considered together.

1. In exception II. F., the Saginaw Intervenors contend that the staff has implicitly amended the position which it took in its safety evaluation and supplemental safety evaluation of the Midland reactors—i.e., that the reactors can be operated without undue risk—by certain letters requiring the applicant to submit additional information and perform certain recalculations. The intervenors urge that the staff was aware of the information giving rise to these letters prior to the initial decision; and that, accordingly, such information should have been brought to the attention of the Licensing Board. The intervenors further assert that, since the information was not brought to their attenion, they were deprived of an opportunity to raise issues suggested by that information; and that, in any case, the Licensing Board had an independent obligation to consider such issues whether or not contested.

Specifically, intervenors refer to six letters and one bulletin written by the staff. Letters 1, 2 and 4 (as designated by intervenors) deal with quality assurance items. Letters 3, 5 and 7 concern problems that have arisen in the industry with respect to other reactors; in some cases they request reviews and calculations on the equipment or design of the Midland reactors to assure that they will not be subject to similar difficulties. In this group, letter 5 concerns a topic which has been of concern for operating reactors for several months, *i.e.*, the fuel densification problem. This problem is, of course, of no immediate concern to the Midland reactors but it is something that must be considered before operation. Item 6 is a bulletin which in-

forms the industry of problems some licensees have had with a certain type of "valve operator." In the Midland situation, this would merely serve as a notice to the designers to check on the reliability of the "valve operators" to be used in these reactors.

All of these items are representative of the normal, routine correspondence which is carried on between the staff and various segments of the reactor industry. As such, they are simply examples of the staff's carrying out ongoing regulatory functions with respect to every reactor, functions it uninterruptedly performs from the inception of the licensing process to the final stages of decommissioning. In these circumstances, they cannot be taken as constituting implicit amendments to the staff's safety evaluation report.

The exception also avers, in essence, that intervnors had recently learned that the staff had determined that the Babcock & Wilcox design as reflected in the Midland reactors is unsafe. No source for that averment is given; and in a written response to questions asked at the oral argument before this Board, intervenors stated that they had relief on information that "came into the possession of Mr. Ford from very reliable sources • • •"[111] We see no reason why such a totally unsupported assertion should be given any credence.

Intervenors further complain that the letters and bulletin had not been forwarded to them. But there is no rule that requires the forwarding of documents of this type to an intervenor. The documents were deposited in the Public Document Room, as required; and they were available to intervenors and anyone else. Indeed, intervenors assert that they became aware of the information in this manner.

---

[111] Letter dated March 26, 1973, from Myron M. Cherry to the Chairman of the Appeal Board for this proceeding.

In sum, the failure to send the documents to intervenors invaded none of their substantial rights.

The exception is therefore denied.[112]

2. Saginaw Intervenors' exception II. G. asserts that because of "amendments" to the staff's evaluation, the ACRS review was not in accordance with Section 182.b of the Atomic Energy Act.[113] As an illustration of such an "amendment," they point to the approval by the staff of the Interim Acceptance Criteria for the emergency core cooling for Baccock & Wilcox reactors, including Midland.

We do not agree with this analysis. The ACRS reviewed this reactor and reported twice to the Commission before the radiological phase of the hearing.[114] The ACRS also reviewed the Interim ECCS Criteria which were adopted by the Commission in June 1971. When the criteria were first approved, they did not include models for the Babcock & Wilcox or Combustion Engineering reactors. Following the staff's approval of models for these two vendors in December 1971, the ACRS reviewed the new criteria incorporating these models and approved them for use.[115]

The Babcock & Wilcox model to which the Midland reactors must conform is detailed in Part 4 of the Interim Criteria. It is obvious that, having reviewed the application for the Midland reactors previously, and having approved the Interim Criteria for the ECCS of Babcock and Wilcox reactors, there was no need for further ACRS review of the Midland reactors.

---

[112] Our discussion in Part III, *supra*, adequately disposes of the intervenors' assertion concerning the Licensing Board's obligation independently to investigate matters such as these.

[113] 42 U.S.C. 2232(b).

[114] Letters from ACRS to the Chairman of the Commission, dated June 18, 1970 and September 23, 1970.

[115] Letter from ACRS to Chairman of the Commission, dated January 7, 1972.

3. The question of the need for further ACRS review is also raised by the Saginaw Intervenors' Motion of March 28, 1973, to incorporate into the record on appeal an exchange of correspondence between theACRS and the Commission relating to ACRS "generic items." By letter of December 18, 1972, the ACRS transimtted a list of generic concerns which it had identified in earlier letters on individual facilities. The December 18 letter listed 25 of the items as being resolved, with the other 22 items remaining unresolved. In its response of February 5, 1973, the Commission manifested its intent to continue to conduct research in order to resolve the other items on a generic basis. It is to be noted that, in its December 18 letter, the ACRS makes it clear that resolution of an item "indicates that the Committee is satisfied in a generic sense;" and that, for unresolved items, the ACRS "will continue to consider [these] items and their significance to safety on a case-by-case basis until generic resolution is reached."

The Saginaw Intervenors focus on the unresolved generic items and assert, in effect, that they must be resolved prior to issuance of any further construction permits. The intervenors, of course, had every reason to be aware of the unresolved items applicable to the Midland reactors prior to the close of hearings here, since they had been reflected in the ACRS letters. That some of them remain unresolved (in the sense of the ACRS letter of December 18, 1972) is not new information which would justify reopening of the record. The only new information is that 25 of these generic items *have* been resolved.

Additionally, the lack of resolution of certain items on a generic basis does not mean that, as applied to the Midland reactors, the particular items have not been satisfactorily dealt with. Such applicable items have been considered in the review of these reactors by the regulatory staff, the ACRS, and the Licensing Board. Accordingly, the

exchange of correspondence in question raises no question as to the validity of any of the Licensing Board's findings.

4. Mapleton Intervenors' exception 3 focuses on the Licensing Board's finding that site meteorology data were incomplete,[116] claiming that construction permits may not issue prior to the completion of the meteorological data and analysis. AEC regulations provide otherwise, and permit certain information to be developed during plant construction.[117] When further meteorological data are required, the AEC makes conservative assumptions as a basis for reaching initial conclusions. The decision below conforms to that standard.[118]

XI. Alleged Deficiencies in Environmental Review

A number of exceptions of both the Saginaw and Mapleton intervenors challenge the environmental review of the Midland facility, in terms of the adequacy of the environmental impact statement, the Board's review of various environmental issues or contentions, and certain procedural rulings of the Board relating to the environmental aspects of the proceeding. In this portion of the decision, we will treat those exceptions of this type with which we have not heretofore dealt.

1. Saginaw Intervenors' exception IV. B. contends that the cost-benefit review performed for this facilitiy is insufficient, because it did not quantify various costs and benefits involved. The intervenors read NEPA and the

---

[116] Initial Decision, par. 23.

[117] 10 CFR § 50.35(a)(2) and (4).

[118] The Board found that the staff's meteorological assumptions "are sufficiently conservative to justify a reasonable expectation that the site is satisfactory" (par. 22). The testimony of intervenors' meteorologist tended to corroborate this finding (Tr. 3406-3687).

Calvert Cliffs' decision [119] as mandating a quantification of "cost and benefits in anticipation of an arithmetic weighing." In this exception, however, the intervenors recognize that "some environmental values (or industrial needs) may not be capable of quantification," and that in those instances NEPA "would permit a qualifying analysis." [120] They nevertheless assert that a Board must at least make an effort to quantify and must set forth reasons for not doing so.

The asserted requirement for quantification of environmental costs and benefits derives from Sections 102(2)(A) and (B) of NEPA, 42 U.S.C. 4332(2)(A) and (B), which direct Federal agencies to:

> (A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making which may have an impact on man's environment; [and]
>
> (B) identify and develop methods and procedures • • • which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic and technical considerations.

Guidelines of the Council on Environmental Quality incorporate but do not expand upon these statutory directions.[121]

---

[119] *Calvert Cliffs' Coordinating Committee* v. *AEC, supra.*

[120] Saginaw Intervenors' Exceptions, pp. 61-62 (fn. 18).

[121] 36 *F.R.* 7724 (April 23, 1971). The requirements are described in somewhat greater detail in the CEQ Memorandum for agency and general counsel liaison on NEPA matters, dated May 16, 1972. On May 2, 1973 (38 *F.R.* 10856) the CEQ issued for comment revised proposed guidelines for the preparation of environmental impact statements which also do not impose any inflexible—or indeed any—requirements relative to the quantification of environmental impacts. Among other things, these proposed guidelines make it clear that, in developing impact statements, agencies should concentrate on the "substance of the information conveyed rather than • • • the particular form, or length, or detail of the statement" (38(b)).

The *Calvert Cliffs'* court read the requirements of Sections 102(2)(A) and (B) of NEPA as contemplating a "rather finely tuned and 'systematic' balancing analysis in each instance." [122] It did not require quantification in all instances. And other courts have made it clear that quantification is not an absolute, and that in some situations it is neither possible nor necessary. *City of New York* v. *United States,* 344 F.Supp. 929, 939 (E.D.N.Y. 1972) (three-judge court). In the words of one court:

> The Court is not here stating that an environmental impact statement • • • would be inadequate simply because the defendants and the Council on Environmental Quality had not identified and developed the methods and procedures to quantify such values. The NEPA does not require the impossible.[123]

It is clear in this case that both the staff, in its Final Environmental Statement, and the Board, in its decision, have balanced the costs of the proposed plant against its benefits. In doing so, the Board found that it was "not possible" to quantify all costs and benefits, and to reach an arithmetical balance, since "more often than not the quantifications are so speculative and non-objective as to be worse than useless." [124] The Board then applied its rationale to particular aspects of the environmental re-

---

[122] 449 F. 2d at p. 1113.

[123] *EDF* v. *Corps of Engineers,* 325 F. Supp. 749, 758 (E.D. Ark. 1971), affd. —— F. 2d ——, 4 ERC 1721 (8th Cir. 1972).

[124] Initial Decision, par. 45.

view. For example, it found serious difficulties with intervenors' attempts to quantify the value of flora and fauna to be disturbed by construction, concluding that their "method of evaluation and calculation [is] wholly insupportable." [125] But it considered these non-quantifiable factors in reaching its final conclusion that the "benefits outweigh the costs." [126]

Intervenors have pointed to nothing which would indicate that costs which were considered only qualitatively could have been adequately quantified, or which would indicate that the Licensing Board did not take the nonquantifiable factors into account. Accordingly, exception IV.B. is rejected.[127]

2. For the same reasons, Saginaw Intervenors' exception V.H. (as it relates to decomissioning) must also be rejected. That exception finds error in the Licensing Board's failure to quantify the cost and environmental effect of decommissioning of the facility, and the storage of long-lived radioactive waste products.

In paragraph 68 of the initial decision, the Board noted that neither the applicant nor its contractor had any experience with decommissioning, and that the AEC's experience in this regard was not with a plant of the proposed size. It found, however, that decommissioning is possible and that the environmental effects of the most likely method of decommissioning (given today's technology) do not appear substantial, "except for the loss of use of a few acres of land occupied by sealed buildings." It

[125] *Id.*, par. 52.

[126] *Id.*, par. 70.

[127] The intervenors have seemingly abandoned their position advanced before the Licensing Board that it is possible to quantify the effects of the destruction of birds and animals such as sparrows and mice.

also estimated the cost of decommissioning, although it admitted that the estimates were "quite speculative." [128]

There is substantial, uncontroverted evidence of record to support these findings.[129] Moreover, it is clear that they were factored into both the Board's cost-benefit analysis, and its consideration of alternatives. We do not read NEPA or the Commission's regulations as mandating a quantification of an environmental effect which is found to be insubstantial. The Board's qualitative analysis was sufficient.

Intervenors' claim that there must be a quantification of the environmental costs of storage of long-lived radioactive waste products is part and parcel of their assertions relative to the Board's consideration of the environmental effects of the uranium fuel cycle; it will be discussed in the portion of this decision dealing with that subject (*infra*, p. 354). [P. 241 of this appendix.]

3. Saginaw Intervenors' exceptions IV.C., IV.G., V.B., V.C., V.D. and V.E. are somewhat related. They contend, in effect, that the Licensing Board should have considered environmental effects associated with the various uses to which the electricity and process steam produced by the plant will be used. These include the environmental effect of selling or not selling process steam to Dow (IV.C.); the effects of increasing or decreasing industrial use (IV. C); the alternative of not constructing the plant at all (IV.G.); the alternatives of finding other sources of electricity, or embarking on a program to conserve electricity V. B. D.); the environmental propriety of the proposed uses of electricity (V.C.); and the alleged artificial stimulation by advertising of the demand for electricity (V.E.).

[128] Initial Decision, par. 68.

[129] See, *e.g.*, Final Environmental Statement (Staff Exh. 6), p. IX-1; Tr. 7820 *et seq.*

a. Most of these effects and alternatives were in fact considered by the Board. Thus, the environmental (as well as safety) consequences of the location of the plant in close proximity to a large chemical plant were factored into the Board's decision.[130] The alternative of not building the plant at all is inherently part of the cost-benefit analysis which was carried out by the Board.[131] The applicant's ability to obtain electricity from other sources was the subject of extensive testimony,[132] which fully supports the Board's finding that "outside sources are unavailable."[133]

Some of intervenors' contentions in these exceptions seek to expand the NEPA review well beyond the pale of what we view as required by NEPA. Thus, while the scope of NEPA consideration of alternatives clearly extends beyond those which an agency itself may effectuate (see *Natural Resources Defense Council* v. *Morton,* 458 F.2d 827 (D.C. Cir. 1972)), a rule of reason nevertheless applies. *Id.* at 837. Contrary to intervenors' view,[134] and giving effect to that rule, the Board was not required to analyze the use to which Consumers' customers might put the power generated by the Midland plant to ascertain whether that use would have an adverse environmental impact. The Board made a finding that the "postulated demand is made up of normal industrial and residential use" and that it need not inquire into the propriety of such customary uses of electricity. We agree.[135]

---

[130] Initial Decision, pars. 12, 14, 16, 46, 54, 55, 56, 57, 64-66, 76. In part VIII of this decision, *infra,* we have supplemented the Board's findings regarding "synergism," as appearing in paragraphs 64-66 of the Initial Decision.

[131] Initial Decision, pars. 45-49, 70-75.

[132] *E.g.,* Tr. 8070-1, 8076-8.

[133] Initial Decision, par. 70.

[134] Saginaw Intervenors' Exceptions, p. 73.

[135] A proposed Commission guide for the preparation of environmental reports, dated August 1972, included a statement which possibly could be construed as requiring consideration of "externalities"—the end uses of electricity. When the report was issued in final form in March, 1973, it was revised to indicate that only the analysis of certain environmental costs associated with the operation of the plant itself, and not costs associated with the uses of electricity, were contemplated. See U.S.A.E.C. Regulatory Guide 4.2, "Preparation of Environmental Reports for Nuclear Power Plants," Section 8.2 (March 1973).

Mapleton Intervenors' exception 8 must also be rejected for the same reasons.

b. As for the contention that the demand for electricity was artificially stimulated by the applicant's advertising, the Board stated that no evidence had been offered to support that contention; and that absent some evidence that applicant was creating abnormal demand, it [the Board] would not consider the question. We do not believe the Board acted unreasonably.

4. In exception IV. D. the Saginaw Intervenors claim that the Licensing Board scheduled the hearing sessions on environmental matters "in such a way as to preclude participation by [Saginaw] Intervenors and their counsel;" and, by so doing, denied such interventors "their due process right to participate in the environmental hearing."

Intervenors stress that the Licensing Board had refused to consider issues they attempted to raise concerning the validity of the ECCS Interim Criteria for the reason that the rulemaking proceeding on those criteria was still in progress. Intervenors further note that, at the same time, the Board denied their April 15, 1972 motion for an indefinite postponement of the Midland environmental hearing, which motion had been based upon their counsel's participation in that rulemaking proceeding. The impression intervenors seek to convey is that their counsel was required to be present at the ECCS proceeding during the

entire period of the scheduled environmental hearing and that, therefore, the Licensing Board was obligated to defer indefinitely the latter. In the totality of circumstances, however, the denial of the indefinite postponement was scarcely an abuse of discretion.

Long before the filing of the motion for postponement, intervenors' counsel had been put on notice by the Board's order of January 6, 1972, that he must make adequate preparation to handle his commitments. Moreover, the notice of hearing for the ECCS proceeding made it clear that the scheduling of licensing proceedings was not to be delayed because of the lack of completion of the rulemaking proceeding.[136] Nevertheless, the Saginaw Intervenors demanded an indefinite adjournment and offered no alternative dates when they were prepared to participate in the environmental hearing.[137]

As indicated in the initial decision, the environmental hearings began on May 17, 1972 and ended on June 15, 1972, after fourteen days of hearings.[138] The record discloses that the hearings in fact took place on the following days: May 17, 18, 19, 22, 23, 24, 25, 30, 31, June 11, 12, 13, 14, 15. An examination of the record of the ECCS proceeding indicates that those hearings were in recess on seven of those days, that the CNI (whom Saginaw Intervenors' counsel represented in the ECCS proceedings) was represented by another counsel on an additional three of the overlapping days, and that the Saginaw Intervenors' counsel participated in the ECCS proceedings on only four of the days when the two proceedings overlapped. Thus on ten out of fourteen of the overlapping days, the Saginaw Intervenors' counsel participated in neither the Midland nor the ECCS proceedings.

---

[136] 37 *F.R.* 288, 289 (January 8, 1972).

[137] See Tr. 5253.

[138] Initial Decision, par. 8.

The scheduling of regulatory proceedings is governed by a number of considerations, only one of which is the convenience of counsel. The Licensing Board has broad discretion in this respect. While it undoubtedly should attempt to accommodate legitimate requests for postponement, it is not required to accede to blanket requests for indefinite postponement which are not accompanied by a good-faith attempt to define a mutually convenient schedule. In any event, counsel who participate in AEC proceedings have an obligation not to over-extend their commitments so as to frustrate the objective of bringing licensing proceedings to a conclusion within a reasonable time frame.

5. In exception IV. I. the Saginaw Intervenors challenge the adequacy of the Final Environmental Statement, and of the Licensing Board's review of that statement, on the basis that the statement failed to include a discussion of reliable scientific fact and opinion which is contrary to the position taken by the agency, and the Licensing Board failed to correct such alleged deficiencies. The intervenors list 8 areas as representative of those "in which there is contrary scientific fact and opinion;" and which are omitted from the impact statement:

a. adequacy and effectiveness of the ECCS

b. reactor pressure vessel failure

c. adequacy of certain valves

d. adequacy of analysis dealing with fuel densification

e. reliability of generation of electricity from nuclear plants

f. genetic effects from cumulative exposure to radiation

g. nature and character of unresolved safety issues, as discussed in "each ACRS letter ever written"

h. adverse effects associated with production of products of Dow Chemical Co.

Citing authority to the effect that "NEPA is, at the least, a law requiring full disclosure," the intervenors find error in the asserted omission of scientific opinion in those areas from the environmental review of this facility.

The only authority cited by intervenors which is possibly relevant to this exception is *Committee for Nuclear Responsibility* v. *Seaborg,* 463F. 2d 783 (D.C. Cir. 1971), where the court ruled that the environmental impact statement for the "Cannikin" nuclear test should set forth "opposing scientific views" and should not completely omit "any reference whatever to the existence of responsible scientific opinions concerning possible adverse environmental effects." The court emphasized that an agency had some discretion in this respect, and that only "*responsible* views need be included." 463 F.2d at p. 787.

This *Cannikin* decision involved questions quite different, and readily distinguishable, from those presented here. At issue there was an agency's preparation of an impact statement for a governmental activity which was not subject to a prior adjudicatory hearing. On the other hand, in an AEC licensing proceeding, the Commission's regulations provide that a party who believes the environmental impact statement is deficient will have the opportunity to present proof in support of his position at the public hearing. The intervenors had that chance here. Interestingly, the *Cannikin* court which found the statement deficient only required that the plaintiffs be given an opportunity to make their submissions on the point discussed in the opinion—no greater relief than what was in fact afforded to intervenors here.

From our understanding of the items covered by this exception, it appears that a variety of views on these

items have indeed been analyzed in this proceeding, or else have been properly regarded as outside its scope. Furthermore, the Saginaw Intervenors could have participated in the environmental hearings and could have sought to bring the opposing views which they wished to sponsor to the fore, but they chose not to do so.[139] Moreover, the impact statement, as well as the initial decision, discusses a broad variety of environmental subjects and views, encompassing the areas in which the intervenors find deficiencies. Not all of the views considered are favorable to nuclear plants in all respects. In the totality of circumstances, this exception must be denied.

6. In exception V. F. the Saginaw Intervenors assert that the Board should have considered issues concerning the environmental effects of the uranium fuel cycle. As they recognize, such consideration is precluded by our earlier ruling in this case in ALAB-60,[140] to which we adhere. See also ALAB-99.[141]

The same issues are raised by the second part of exception V.H. which asserts error in the Board's failure to quantify (or even to consider) the environmental effects of the storage of long-lived radioactive waste products. This matter is similarly governed by ALAB-60 and ALAB-99.

7. Both the Saginaw and Mapleton intervenors except from the Licensing Board's resolution of issues concerning the environmental effects of fogging and icing

---

[139] The Mapleton Intervenors presented testimony by Dr. Sternglass in the area covered by item f. (i.e., a challenge to 10 CFR Part 20), but the Licensing Board declined to adopt Dr. Sternglass' views. *Cf. Trustees of Columbia University in the City of New York,* ALAB-50, WASH-1218 320, 336-349 (May 18, 1972).

[140] ALAB-60, WASH-1218 (Suppl. 1) 459 (July 19, 1972).

[141] *Long Island Lighting Co.* (Shoreham Nuclear Power Station), ALAB-99, RAI-73-2 53 (February 1, 1973).

associated with the cooling pond. In paragraph 69 of the initial decision, the Licensing Board rejected the Mapleton intervenors' evidence on this subject, finding that it did not support the contention that there would be substantial fogging and icing in the area around the cooling pond (including Mapleton). The Board found the likely effect on Mapleton to be "negligible" and, even in the area close to the pond, as "insubstantial and the environmental costs minimal." The Board also found, however, that further studies of the effects of cooling ponds were needed.

The Saginaw Intervenors, in exception V. I., and the Mapleton Intervenors, in exception 10, challenge the apparent inconsistency between the finding of a need for further study of cooling ponds and that concerning the minimal or negligible effects of such ponds. There is substantial evidence of record, offered by the applicant and the staff, supporting these latter conclusions. But relative to the need for further study, a staff witness testified that the report prepared by the applicant on this subject was the first systematic study of steam fog from a cooling pond that attempted to relate data to atmospheric conditions for the purpose of prediction of fog formation. He also testified that he disagreed with many aspects of the report.[142] The staff witness indicated, however, that the study was conservative, and that it probably over-predicted rather than under-predicted the fog and icing effects of the cooling pond.[143]

The Final Environmental Statement recommended that the applicant develop an ecological surveillance and monitoring program "which will document the impact of the plant operations upon the ecology of the site and environs."[144] The Board quite understandably stated that

[142] Tr. 7441-2.

[143] Tr. 7445, 7461-2.

[144] Final Environmental Statement, Summary and Conclusion, item 7(d). The applicant has agreed to follow this recommendation. (Initial Decision, par. 78.)

the applicant should include in its surveillance program a study of the duration, intensity and extent of fog and icing in the surrounding area. That statement is entirely consistent with the Board's findings, which are supported by the record, that the environmental effect from fogging and icing seems likely to be negligible or insubstantial.

8. Saginaw Intervenors' exceptions V.J. and V.K. assert that, in its environmental review, the Licensing Board failed to take into account and quantify the "unreliability of nuclear power plants as evidenced by the [Commission's] reactor operating reports," and the "effect, if any, • • • on the economic operation of the Midland plant if current Government subsidies of uranium fuel are eliminated or if current resources of uranium are depleted" during the plant's useful life.

Before the Licensing Board, the Saginaw Intervenors raised the question of the economics and reliability of nuclear power plant generation.[145] However, they offered no evidence on this question. In their exceptions, they ask us to take "official notice" of the (1) various "unresolved problems associated with nuclear power," (2) the purported failure of the nuclear industry to have resolved quality assurance and quality control matters; (3) all Reactor Operating Reports; and (4) the "current difficulties surrounding the construction of the breeder."

The record, however, includes specific information concerning the reliability of nuclear power, which indicates that the reliability of nuclear plants and fossil plants are roughly equivalent.[146] Absent any contrary evidence, there

[145] Statement of Environmental Contentions, dated February 6, 1972.

[146] Final Environmental Statement, p. XII-6; Tr. 8085, 8086. See also ALAB-106, *supra*.

was no reason for the Board to factor differing reliability estimates into its evaluation of nuclear and other plants as alternatives. As for the alleged effects of the withdrawal of government subsidies of uranium fuel, or the depletion of uranium supplies, the only evidence of record on this subject indicated that the purported subsidies do not exist,[147] and that uranium would continue to be available over the life of the plant.[148]

Given this state of the record, we find no error in the Licensing Board's disposition of these matters.

9. In their exception V.L. the Saginaw Intervenors question the continuing validity of the Commission's regulations in 10 CFR § 50.35, which permit issuance of a construction permit prior to the resolution of certain isues or the gathering of certain data, subject to certain conditions. The intervenors contend that NEPA invalidates this procedure, and requires that both the safety and environmental judgments with respect to the facility be made on the basis of a "completely designed facility."

This provision of AEC regulations is, of course, an integral part of the Commission's two-step licensing procedure. That procedure, as intervenors recognize, was explicitly sanctioned by the Supreme Court in *PRDC* v. *International Union of Electrical, Radio and Machine Workers, AFL-CIO,* 367 U.S. 396 (1961).[149] That decision, which involved the Commission's safety regulations, approved a regimen where a construction permit could be issued even though final design of all components of a reactor had not been completed, and even though information necessary to

[147] Tr. 7034-38, 7924-37.

[148] See, *e.g.*, FES, p. XII-5; Tr. 6588-92; 7920.

[149] Contrary to intervenors' apparent belief (see exceptions, p. 125, fn. 82) we do not read *PRDC* as being premised on any requirement for a mandatory hearing at the operating license stage.

be considered prior to operation of the reactor had not yet been compiled. One necessary predicate for such issuance, however, is findings by the Commission that such further technical or design information as might be required to complete the safety analysis, and which could reasonably be left for later consideration, would be supplied prior to reactor operation. Additionally, it must be found that safety features or components which require research and development have been described by the appplicant and that the applicant has identified, *and there will be conducted,* a research and development program reasonably designed to resolve any safety questions associated with such features or components.[150]

When an applicant receives a construction permit predicated upon such findings, it proceeds at its own risk. Prior to operation, the applicant must satisfy all safety requirements; and if additional research performed or data acquired during construction indicates that any safety requirement cannot be satisfied, the operating license must be denied or appropriately conditioned. As *PRDC* indicates, this is so regardless of the amount of money which an applicant may have expended during construction.

The same conditions govern the Commission's environmental review. At the construction permit stage, a licensing board is required to undertake a thorough analysis of the projected environmental effect of the reactor. Where additional information is needed, a board may permit the development of such information during construction. Nevertheless, with regard to aspects of plant operation which may have an environmental impact—*e.g.*, effluent releases which are governed by proposed Appendix 1 to 10 CFR Part 50—the plant must meet AEC regulatory standards prior to operation.

[150] See 10 CFR § 50.35(a).

NEPA did not overturn the *PRDC* decision, either expressly or by implication. As one court has stressed, it would be "wholly impracticable to require that the ultimate environmental design • • • be included in the EIS. • • • An undertaking of such magnitude is beyond the scope of § 102(2)(C)." [151] Thus, in requiring the preparation of environmental impact statements, NEPA requires a thorough analysis of such information as can reasonably be obtained —and no more. As with safety matters, where further information is needed, it must be obtained prior to issuance of an operating license, so that applicable environmental standards will be satisfied.[152]

The regulations of the Commission are consistent with this view. Exception V. L. is accordingly denied.

10. The Mapleton Intervenors, in their exceptions 5, 6 and 7, take issue on a generalized basis with all of the Licensing Board's enviromental findings and conclusions. The only particular contentions which we can isolate from the broad generalities asserted are those challenging the findings in paragraph 73 of the initial decision (issues which we have dealt with in Part IV. 4.b, *supra*); those challenging the Board's cost-benefit balancing (see Parts IV.4.b and XI. 1, *supra*); and those challenging the Board's treatment of the environmental effects of major accidents (see Part IX, *supra*) and low-level radiation releases (see Part IV. 4.b, *supra*). These exceptions are denied for the same reasons that we rejected comparable assertions made by the Saginaw Intervenors.

11. In exception 11, the Mapleton Intervenors except to the Board's asserted refusal to consider evidence pur-

[151] *EDF v. Corps. of Engineers*, 348 F. Supp. 916, 938-39 (N.D. Miss. 1972).

[152] § 185, Atomic Energy Act, 42 U.S.C. 2235; *Cf. Arkansas Power and Light Co.* (Arkansas Nuclear One Unit 2), ALAB-94, RAI-73-1 25, 30 (January 18, 1973).

portedly offered by those intervenors on "the hazards of Electro-Magnetic Pulse (EMP)." The exceptions do not identify the subject matter or content of the evidence offered, or the occasion when the alleged offer of proof was turned down. Lacking any particularity whatever, this exception must be denied. See 10 CFR § 2.762(a).[153]

XII. Water Quality Requirements

In its NEPA balancing, the Licensing Board considered the contemplated thermal discharges from this plant.[154] Relying on studies conducted by the Michigan Water Resources Commission, the Michigan Department of Natural Resources, and Dow Chemical Co., the Board found the Tittabawassee River to be of "depressed quality." It further found, however, that the Michigan Water Resources Commission was implementing a program to upgrade the river; that there will be "some destruction" of aquatic life although, in view of the present quality of the river, the amount was conjectural; but that even after improvement of the river, "the aquatic life destroyed should not be significant." [155]

The Board required the applicant to conduct a thorough ecological study prior to plant operation to establish base line values, and noted that the applicant "has committed itself to discharges that are significantly lower than those permitted by the standards for thermal releases and total

[153] At one point in the proceeding, the Mapleton Intervenors indicated that they wished to offer testimony on "the effect of a lack of electromagnetic capability on the environment should the plant be built." (Tr. 2685). The Board expressed the belief that this issue was "outside the scope of the issues in this proceeding" (Tr. 2688) but gave the intervenors the opportunity to submit an offer-of-proof in writing (Tr. 2690). The intervenors failed to take advantage of that invitation.

[154] Initial Decision, par. 62-63, 77.

[155] *Id.*, par. 63.

dissolved solids." In the latter connection, the record indicates that the applicant has committed itself to a cooling system designed to "limit the temperature of the pond discharge [into the river] to approximately 1°F above the ambient temperature of the river;"[156] and that State standards currently would permit a rise of 5°F above ambient temperature.

Under NEPA, the Board's handling of the thermal issue was appropriate, and the balance struck was reasonable. However, on October 18, 1972—after the close of evidentiary hearings but prior to the initial decision—the Federal Pollution Control Act Amendments of 1972 (P.L. 92-500, 86 Stat. 816, hereinafter FWPCA) became law. The FWPCA, as recognized by the Commission's Interim Policy Statement,[157] is applicable to licensing proceedings such as this, where no final Commission action had been taken prior to October 18, 1972.

Our recent *Hanford* decision discussed the impact of the FWPCA on proceedings such as this one.[158] The FWPCA may affect the Commission's NEPA responsibilities in the area of water quality. The Commission's NEPA responsibilities will be modified as various implementing actions are taken under the FWPCA by the Environmental Protection Agency and the State. The Policy Statement harmonizes the AEC's licensing responsibilities under NEPA with the requirements of the FWPCA to assure that, until various FWPCA implementing actions are taken, the Commission will continue to carry out its NEPA functions in full.

---

[156] FES, p. III-8.

[157] "Interim Policy Statement on Implementation of Section 511 of the FWPCA" (Policy Statement), 38 *F.R.* 2679, January 29, 1973.

[158] *Washington Public Power Supply System* (Hanford No. 2 Nuclear Power Plant), ALAB-113 (April 12, 1973).

On February 28, 1973, the State of Michigan's Water Resources Commission certified that with respect to the Midland Nuclear Plant, "pursuant to Section 401 of the FWPCA, as amended, • • • there is not an applicable effluent limitation or other limitation under Sections 301(b) and 302 of the FWPCA • • • and there is not an applicable standard under Sections 306 and 307 thereof."[159]

The applicant (through its counsel at the oral argument before this Board) committed itself to adhere to whatever standards might be imposed by the FWPCA.[160] Moreover, the applicant will be required, without any implementing action on AEC's part, to comply with applicable limitations or other requirements promulgated or imposed pursuant to the FWPCA.

In these circumstances, we are justified in determining that the Midland facilities will comply with the applicable limitations or other requirements of the FWPCA.

While State law would apparently permit a variation in ambient temperature of up to 5°F, the applicant has agreed with the State of Michigan to meet a 1°F limitation. This agreement is between the State of Michigan and the applicant and is not a result of any condition imposed in this proceeding. The Licensing Board performed its NEPA balance in the water quality area on the basis of the agreed-to limitation. The Board has carried out its NEPA func-

---

[159] The Section 401 certification is in addition to the certification received by the applicant on March 12, 1971, under Section 21(b), the section of the FWPCA which prescribed the certification requirements prior to its October 1972 amendments. We need not rely on that certification in this proceeding because of the February 28, 1973, Section 401 certification. We note that the Environmental Protection Agency has also conducted the review of Michigan's water quality standards (in effect prior to the October 1972 amendments to the FWPCA), as provided by Section 303(a)(1) and (a)(2) of the FWPCA.

[160] AB Tr. 110, 147-8.

tions in the water quality area in full so that there is no gap in the environmental review in that area.[161]

XIII. Remaining Exceptions

We have carefully considered all of intervenors' other exceptions and find them without merit. With respect to the Saginaw Intervenors' claim [162] that certain of the Licensing Board's findings and conclusions were not accompanied by a sufficiently detailed articulation of their basis, we have previously described the standard of specificity mandated by the applicable statutory and regulatory requirements as one which "requires communication of what has been decided and such findings as will permit the parties, the public, and a reviewing court to ascertain the agency's reasoning in reaching its decision." [163] We are satisfied that the initial decision meets that standard.[164] None of the remaining exceptions warrants any discussion at all.

---

[161] Saginaw Intervenors' exception V.G. contends that the Licensing Board failed to do an independent cost-benefit analysis of the State of Michigan water quality standards. Authorities cited by the intervenors do not support this assertion. Section 511 of the FWPCA does not impose on Federal licensing agencies any such NEPA responsibility regarding water quality matters.

[162] Exceptions II. K., II. M. and IV. H.

[163] *Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Nuclear Power Station, ALAB-73, WASH-1218 (Suppl. 1) 495, 497 (October 11, 1972). See also *Boston Edison Co.* (Pilgrim Nuclear Power Station), ALAB-83, WASH-1218 (Suppl. 1) 552, 569 (December 4, 1972); *Trustees of Columbia University in the City of New York,* ALAB-62, WASH-1218 (Suppl. 1) 464, 465 (July 28, 1972).

[164] Moreover, intervenors' failure to file adequate proposed findings and conclusions gives a hollow ring to their claim that the Licensing Board should have gone into greater detail.

XIV. Conclusion

For the reasons stated above, the authorization of the issuance of construction permits to the Midland facility was correct. Accordingly, subject to the modification directed in ALAB-106, the initial decision of the Licensing Board is *affirmed.*

It is so ORDERED.

For the Atomic Safety and Licensing Appeal Board

Margaret E. Du Flo
Secretary to the Appeal Board

Dated: May 18, 1973

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

ALAN S. ROSENTHAL, *Chairman*
DR. JOHN H. BUCK, *Member*
WILLIAM C. PARLER, *Member*

In the Matter of
CONSUMERS POWER COMPANY (Midland Plant, Units 1 and 2) — Docket Nos. 50-329, 50-330

Memorandum and Order

November 26, 1973

(ALAB-160)

Saginaw Intervenors have filed what they choose to characterize as a motion "to clarify" ALAB-123, RAI-73-5 331 (May 18, 1973). The motion is based upon the November 6, 1973 memorandum and order of the Commission in *Niagara Mohawk Power Corporation,* (Nine Mile Point, Unit No. 2), Docket No. 50-410, RAI-73-11 995. In that memorandum and order, the Commission reversed certain prehearing conference orders of a licensing board insofar as they precluded the presentation of evidence on energy conservation. The proceeding was remanded to that board with appropriate directions.

Despite the label appended to it, the Saginaw Intervenor's motion appears in actuality to assert a conflict between ALAB-123 and the *Nine Mile Point 2* memorandum and order. In a real sense, the relief which the Saginaw Intervenors seek is a remand of *Midland* to the Licensing Board "for further proceedings to consider questions of energy conservation" (Motion, p. 22).

ALAB-123 was rendered more than six months ago. It affirmed, with a limited exception not here relevant, the initial decision of the Licensing Board.[1] In the circumstances, we think it at best doubtful whether we now are empowered to entertain what is essentially a new attack by the Saginaw Intervenors upon the initial decision. Be that as it may, since the motion is based exclusively upon a recent ruling of the Commission, it seems to us that the Commission itself is the body which should decide whether the sought reopening of the *Midland* proceeding is warranted. This is especially so since, in its *Nine Mile Point 2* memorandum and order, the Commission made specific reference to ALAB-123 (as well as to our more recent decision in *Long Island Lighting Co.* (Shoreham Nuclear Power Station), ALAB-156, RAI-73-10 831 (October 26, 1973).

Accordingly, the motion is referred to the Commission for such disposition as it may deem appropriate.

It is so ORDERED.

FOR THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

MARGARET E. DUFLO
Secretary to the Appeal Board

[1] The only issues left open by ALAB-123 related to quality assurance matters. Over six weeks ago, those matters received final disposition on our part. ALAB-152, RAI-73-10 816 (October 5, 1973).

ATOMIC ENERGY COMMISSION REPORTS

Volume 7

OPINIONS AND DECISIONS OF THE
ATOMIC ENERGY COMMISSION
WITH SELECTED ORDERS

January 1, 1974, to June 30, 1974

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

CLI-74-5

COMMISSIONERS:

DIXY LEE RAY, *Chairman*
CLARENCE E. LARSON
WILLIAM O. DOUB
WILLIAM A. ANDERS

In the Matter of — Docket Nos. 50-329
CONSUMERS POWER CO. — 50-330
(Midland Plant, Units 1 and 2) — January 24, 1974

Mr. HAROLD F. REIS, for the applicant.

Mr. MYRON M. CHERRY, for the Saginaw Intervenors.

Messrs. MILTON R. WESSEL and JAMES N. O'CONNOR, for the Intervenor Dow Chemical Co.

Messrs. DAVID E. KARTALIA and ALBERT V. CARR, for the AEC Regulatory Staff

HEADNOTE

Commission clarified its position (Niagara Mohawk Power Corp., CLI-73-028, RAI-73-11-995) relative to licensing consideration of energy conservation issues and reaffirmed its approving citations to Shoreham (ALAB-156, RAI-73-10-831) and Midland (ALAB-123, RAI-73-5-331) proceedings. The Niagara decision was not meant to give indiscriminate approval to any energy conservation contention but, rather, instructed ASLB against barring "at the threshold" those basic issues that could have bearing on electrical demand projections. The Commission also affirmed both ASLAB and ASLB handling of the challenged issues and denied motion to reopen hearing. See also pending judicial cases (Aeschliman v. AEC, No. 73-1776, and Saginaw Valley Nuclear Study Group v. A.E.C., No. 73-1867, before D.C. Cir.) which were held in abeyance (Anchor Line Ltd. v. F.M.C., 299 F.2d 124 (D.C. Cir.), cert. denied, 370 U.S. 922 (1962)) pending agency consideration of this motion.

Guidelines must be developed on case-by-case basis due to varying circumstances and generality of "energy conservation" concept. However, as a basic threshold test, energy conservation issues: (1) must relate to some action, methods, or developments that would curtail demand for power to a level at which the proposed facility would not be needed; (2) must pertain to an alternative that is reasonably available; and (3) impact of proposed alternatives on demand must be susceptible to a reasonable degree of proof. See N.R.D.C. v. Morton, 458 F.2d 827 (D.C. Cir. 1972). Individual merits of four types of energy conservation contentions (end uses of electricity, validity of demand projections, promotional activities by applicant, and rate structure) were evaluated for admissibility as issues.

In view of broad discretion given administrative agencies to limit or preclude retroactive application of new rules developed in adjudication, Commission stated its position

not to apply Niagara decision retroactively to cases which had progressed to final order and issuance of construction permits before decision date. See S.E.C. v. *Chenery Corp., 332 U.S. 194 (1947); Department Store Union v. N.L.R.B., 466 F.2d 380 (D.C. Cir. 1972); N.L.R.B.* v. *Majestic Weaving Co., 355 F.2d 854 (2nd Cir. 1966).*

In agency licensing proceedings where public interest findings are requisite, burden of proof for ultimate permit or license issuance rests on applicant (Administrative Procedure Act 7(c); 10 CFR 2.732); however, Commission regulations under 10 CFR 50 App. D place responsibility on applicant ((A.1)(c)), staff (A.8), and ASLB (A.11) for possible consideration of energy conservation alternatives. Yet, in this emergent stage of novel and evolving energy conservation concept, intervenors also have responsibilities to state clear and reasonably specific contentions in a timely fashion, with an affirmative showing if these novel contentions are to be explored further (United Church of Christ v. *F.C.C., 425 F.2d 543 (1969)).*

Memorandum and Order

BACKGROUND

The Saginaw Intervenors filed with the Atomic Safety and Licensing Appeal Board a motion to "clarify" the Board's principal decision (RAI-73-5-531) in the subject proceeding in light of our recent Memorandum and Order in *Niagara Mohawk Power Corporation* (Nine Mile Point, Unit No. 2), Docket No. 50-410, RAI-73-11-995. The Appeal Board decision, affirming (with a limited exception not relevant here) the initial decision of the Licensing Board, became final some months ago. Petitions to review that order are pending before the United States Court of Appeals for the District of Columbia Circuit.[1] In these cir-

[1] *Aeschliman* v. *AEC*, No. 73-1776, and *Saginaw Valley Nuclear Study Group* v. *AEC*, No. 73-1867.

cumstances, the Board referred the motion to us for such disposition as we might deem appropriate. ALAB-160, RAI-73-11-1002.[2]

Pursuant to our invitation, the applicant Consumers Power Co., the intervenor Dow Chemical Co., and the AEC Regulatory Staff have submitted responses to the Saginaw motion. Saginaw was granted permission to and did file a reply to these responses.

For the reasons set forth below, insofar as the Saginaw motion seeks to reopen these proceedings, it is denied.

THE SAGINAW MOTION

The Saginaw motion reads the Appeal Board's decision in this case as holding that the Licensing Board "properly excluded consideration of energy conservation issues raised by the Saginaw Intervenors," Motion, pp. 1-2. Read in that light, Saginaw contends that the decision conflicts with our recent *Niagara* ruling, where we said—

> It is true that the parameters of our statutory power to compel conservation are not clear. But it does not follow that all evidence should therefore be barred at the threshold. See *Long Island Lighting Co.* (Shoreham), ALAB-156, decided October 26, 1973, RAI-73-10, p. 852; *Consumers Power Co.* (Midland), ALAB-123, May 18, 1973, RAI-73-5, p. 352.

[2] Simultaneously with filing of the instant motion, the Saginaw Intervenors moved the Court of Appeals for an extension of time in which to file their brief until after disposition of the instant motion. Viewing the motion as, in substance, a request that the case be held in abeyance pending agency action (see *Anchor Line Ltd.* v. *FMC*, 299 F.2d 124 (C.A.D.C.), *cert. denied*, 370 U.S. 922 (1962), the Commission and the United States acquiesced in that procedure. The Court of Appeals directed that we rule on the motion to clarify and, if we find it necessary to reopen these proceedings, to request remand, by January 28, 1974. Order of January 11, 1974.

Saginaw questions the appropriateness of our approving citations in *Niagara* to the *Shoreham* and *Midland* opinions, drawing our attention to allegedly inconsistent portions of those opinions discussing whether the nature of customer uses represented in projected demands for electricity may be placed in issue in licensing proceedings. Motion, pp. 5-6.

Prior to the environmental hearings in the subject proceeding, Saginaw submitted to the Licensing Board a "Statement of Environmental Contentions" listing 119 separate issues it sought to raise in the hearing. The instant motion undertakes to paraphrase 17 of these "contentions," which are now characterized as "energy conservation issues." Following discussion of certain Licensing Board rulings and the initial decision, Saginaw alleges that—

> It is clear beyond peradventure that the Saginaw Intervenors raised issues of energy conservation similar to (and in some cases identical to, e.g., rate structure) those raised by the intervenor in the *Niagara* docket. It is equally clear that the Licensing Board ruled as beyond the scope of the proceedings all issues of energy conservation except, perhaps, one (promotional advertising) . . . Motion, pp. 19-20.

Saginaw goes on to allege, in substance, that the Appeal Board broadly sustained exclusion of energy conservation issues, including the claim that the Appeal Board "made it quite clear that postulated demand may not be inquired into . . ." Motion, p. 21.

The Saginaw motion requests "clarification" of the Appeal Board's decision in accordance with its reading of *Niagara* and a remand of these proceedings for further hearings on energy conservation issues. In the alternative, Saginaw requests a decision making clear "how [the Appeal Board's decision here] and *Niagara* are consistent so

that an unambiguous record may be had in the prosecution of court appeals." Motion, p. 22.

The responses filed by the applicant and the Regulatory Staff contend, among other things, that Saginaw has misinterpreted our ruling in *Niagara,* the Appeal Board's rulings in this case and in *Shoreham,* and the relevant Licensing Board rulings in this case. They note that many of the issues Saginaw now claims were excluded were, in fact, allowed. They point out that some of Saginaw's paraphrases in the instant motion of the "energy conservation" issues it sought to raise before the Licensing Board distort the administrative record. They also contend that the alleged "energy conservation" issues which were excluded by the Licensing and Appeal Boards were properly excluded from this proceeding. We agree.

The Niagara Ruling

In our recent *Niagara* ruling, we dealt for the first time with the relevance in licensing proceedings of "energy conservation" issues—a rather general term we did not there attempt to define. Saginaw apparently reads *Niagara* to mean that virtually any action or development which might ultimately lead to reduced aggregate demands for electricity, including some having quite remote or speculative effects on demand, may be made an issue in a licensing proceeding. *Niagara* established no such sweeping proposition.

In *Niagara,* the intervenors made contentions concerning concrete measures they alleged might eliminate the need for electricity to be generated by the proposed plant. Those measures included—

(1) Selective load-shedding during periods of peak demand;

(2) Changes in the rate structure for electricity designed to decrease demand—such as modification of volume discounts, or raising prices during peak demand periods:

(3) Cutting wasteful uses of electricity, such as space heating, and

(4) Reducing promotional advertising which fosters demand for electricity.

Thus framed, these contentions, at least on their face, could have a bearing on the applicant's or Regulatory Staff's projections of demand—the basic issue to which energy conservation contentions are relevant in the licensing context. It was the Licensing Board's barring "at the threshold" of any consideration of any of these questions which we disapproved.

Our citation in *Niagara* to portions of the Appeal Board's rulings in *Shoreham* and *Midland* are fully consistent with what we have said. Thus, we cited with approval page 852 (RAI-73-10) of the Board's opinion in *Shoreham,* where the Board sustained the Licensing Board's finding that the applicant's projections of power needs were reasonable. The Licensing Board had admitted certain evidence offered by an intervenor to the effect that demand might be reduced by "further educating the public in conservation measures." The Licensing Board had found, however, that that evidence—

> . . . contained little practical guidance for action beyond the significant effort already being made, and no estimate of how much demand might be reduced . . .

The Appeal Board found this to be an "accurate appraisal," and stated that it might dispose of the intervenor's argument "simply on the basis that the evidence does not support it." The Appeal Board, then, clearly ruled that the "energy conservation" evidence actually offered in *Shoreham* was properly admitted, and we endorsed that ruling in *Niagara.*

The Appeal Board's *Shoreham* opinion goes on to discuss in rather lengthy dicta "the more fundamental issue of

whether questions concerning the *nature* of electrical demand are appropriate for consideration in a proceeding of this type." (Emphasis added.) *Id.* at 852-854. The Saginaw motion inaccurately characterizes this portion of *Shoreham* as a holding. Be that as it may, *Niagara* neither approves nor disapproves this portion of *Shoreham.*

Similarly, our citation in *Niagara* to page 352 of the *Midland* decision, as reproduced in RAI-73-5, referred to that portion of the opinion (paragraph 3b) discussing the Saginaw intervenor's contention that "the demand for electricity was artificially stimulated by the applicant's advertising."[3] Such a contention raises a legitimate issue, and this was recognized by both the Licensing Board and Appeal Board, although they did not use the label "energy conservation." However, no evidence was offered in support of this contention.

As we said in *Niagara,* this is a time of "deep national concern over energy sources and supply—a concern which the Commission fully shares." But the phrase "energy conservation" has a deceptively simple ring in this context. Taken literally, the phrase suggests a virtually limitless range of possible actions and developments that might, in one way or another, ultimately reduce projected demands for electricity from a particular proposed plant.

It would be neither possible nor desirable for us to lay down, at least at this juncture, very precise guidelines governing the kinds of energy conservation issues which should be allowed in licensing proceedings. Widely varying factual circumstances in individual cases, coupled with the inherent generality of the "energy conservation" concept, dictate that such guidelines be developed on a case-by-case basis, or, perhaps, through rulemaking. Nevertheless, certain

---

[3] Our approving citation to page 352 of the *Midland* decision did not include the carryover paragraph from page 351 (paragraph 3a), which discusses whether inquiries into "the propriety of . . . customary uses of electricity" should be made.

basic considerations can be stated from the present vantage point. Purported energy conservation issues must meet a threshold test—they must relate to some action, methods or developments that would, in their aggregate effect, curtail demand for electricity to a level at which the proposed facility would not be needed. As discussed hereafter, several of Saginaw's alleged "energy conservation" issues have nothing to do with projected demand. Beyond that, the issue must pertain to an alternative that is "reasonably available."[4] *Natural Resources Defense Council* v. *Morton*, 458 F.2d 827, 834 (C.A.D.C. 1972). Furthermore, the impact of proposed energy conservation alternatives on demand must be susceptible to a reasonable degree of proof. Largely speculative and remote possibilities need not be weighed against a convincing projection of demand. Here, as with many other issues under the National Environmental Policy Act of 1969, a rule of reason applies. See *Natural Resources Defense Council* v. *Morton, supra.*

The contentions we approved in *Niagara* meet these tests. For example, possible restrictions on promotional advertising might well have a direct and appreciable effect on demand. The same may also be true of selective load-shedding during periods of peak demand, modifications of rate structures, or cutting wasteful uses of electricity. While the Commission might well lack authority to mandate such actions, that fact alone does not preclude our inquiry into seemingly feasible actions by State or other federal agencies. *Natural Resources Defense Council* v. *Morton, supra.*

The Saginaw "Energy Conservation" Contentions

The Saginaw motion alleges that, with the exception of one issue concerning promotional advertising, the Licensing

[4] For example, one of the Saginaw energy conservation contentions herein (contention 33) suggests investigating ways of generating electricity through means "not now known to man." Such suggestions need not be entertained.

Board ruled that issues of energy conservation were "as a matter of law, beyond the scope of the licensing proceeding." Motion, p. 15. As not above, the Saginaw motion paraphrases 17 of the 119 contentions it submitted to the Board, and characterizes them as "energy conservation" issues. Saginaw's current paraphrases of several of the contentions it actually submitted to the Board are inaccurate and misleading.[5] We deal, of course, with the contentions actually submitted to the Board.

The Saginaw "Statement of Environmental Contentions" was hardly a model pleading. As the Licensing Board noted, certain contentions of Saginaw's were "long on rhetoric and short on specificity."[6] Many contentions were redundant.[7] And many sought to raise multiple and more or less unrelated issues.[8] Although Saginaw now professes to view 17 of its 119 contentions as "energy con-

[5] For example, the motion states that contention 31 related to "promotional activities such as advertising or the sale of appliances." That contention did not refer to the sale of appliances.

The motion states that contention 32 "raised the question of various methods" of energy conservation. No "methods" were suggested by that contention. In fact, the contention referred only to "the possibility of changing the present social stimuli to society which could result in decreased demand for electricity." Such a vague generality is insufficient to raise a factual issue.

The motion states that contention 33 "raised the conservation issue of denying electricity to some customers and in particular Dow Chemical Company." The contention actually deals with the possibility of securing electricity from other sources, and has no bearing on energy conservation in the sense of reducing aggregate demand for electricity.

Similar distortions of the record occur with respect to contentions 49, 88, and 89.

[6] Order with respect to Environmental Issues, March 27, 1972, p. 7 (hereafter "Order").

[7] See, *e.g.*, contentions 31, 47, 75 and 76 concerning promotional activities.

[8] See, *e.g.*, contentions 33 and 34.

servation" contentions, its original submission to the Board did not point up any such common theme.[9]

In response to this diffuse barrage, both the Licensing Board and the Appeal Board dealt with the contentions by groups, except where they considered it necessary to refer to specific contentions. We will deal similarly with the alleged "energy conservation" contentions.

Summarizing the analysis which follows, we find that Saginaw properly raised one related group of legitimate energy conservation issues which the Licensing Board allowed. Saginaw obliquely raised a second energy conservation issue essentially similar to the rate structure issue we allowed in *Niagara,* which the Board also allowed. The Board properly excluded several alleged energy conservation contentions concerning certain customer uses of electricity. Finally, several other contentions of Saginaw's allegedly precluded by the Board were in fact allowed, but they had nothing to do with energy conservation.

1. Contentions Relating to Promotional Activities

Contentions 31, 47, 75 and 76 deal redundantly with the claim that the applicant has created artificial demands for electricity through advertising and other (largely unspecified) promotional activities. As we held in *Niagara,* contentions of this nature raise legitimate energy conservation issues. The Licensing Board authorized the introduction of evidence on such matters.[10] Saginaw never offered any

[9] Rather, the alleged "energy conservation" issues were scattered under four separate subject matter headings, only one of which had any direct bearing on energy conservation.

[10] The Board's order stated that "in its affirmative case, Saginaw should . . . specify the portion of the demand attributable to advertising by applicant and the basis of that conclusion." Order, p. 9. A similar promotional advertising contention was raised by the Mapleton Intervenors and allowed by the Board. Order, p. 14. In addition, the Board ruled generally that "the need for power from the proposed plant is, of course, an issue in this proceeding." Order, p. 10.

such evidence, and the Licensing Board held that absent some evidence that the applicant was creating abnormal demand, it would not consider the question. The record did contain substantial evidence and the Board found that "postulated demand is made up of normal industrial and residential use." The Appeal Board affirmed these rulings.

2. Contentions Relating to Rate Structure

The Saginaw motion alleges that contention 49—

> called into question the Michigan Public Service Commission's rate structure applicable to applicant's marketing of electricity arguing that the existing rate structure encourages rather than discourages demand.

Evidence pertaining to such a contention is admissible, as we held in *Niagara.* But no such contention was made here. Saginaw's contention 49 actually reads as follows:

> Applicant and the Michigan Public Service Commission have illegally created an incentive for continual construction of generating facilities when they are unnecessary. The rate structure imposed upon Applicant by the Michigan Public Service Commission encourages Applicant to create unwarranted costs upon the environment. Because Applicant's ability to receive a fair return on its invested capital is directly related to outstanding amounts of unamortized construction and other capital costs, Applicant has an incentive to continue to construct power facilities, whether necessary or not, in order to maintain an artificially high rate structure. Specifically, Intervenors contend that Applicant is failing to use existing generating facilities to the extent of their useful lives and it is taking such

> facilities out of base load or peaking service after such facilities have been amortized and removed from consideration of Applicant's rate structure. Thus, the proposed Plant represents an attempt to construct a facility in order to maintain an artificially high rate structure and, as such, it represents an unwarranted cost to the environment.

The burden of this contention, of course, is that the State's rate structure encourages construction of unneeded plants. Whatever the merits of that contention may be, it raises an entirely different issue from the issue we approved in *Niagara*. The *Niagara* issue, relating to rate structures which may possibly encourage high-volume consumption of electricity, bears on our concept of energy conservation. The Saginaw contention has, at best, a remote relationship to energy conservation.

Saginaw obliquely raised an issue essentially similar to the *Niagara* rate structure issue in the last sentence of its contention 88. Most of that contention was addressed to the separate issue whether projected growths of certain of the applicant's large industrial users were accurate. However, the contention concludes with the statement that—

> Concomitantly, applicant has failed to factor into its projection the possibility that rate structures will be revised so as to make large use of electricity on a per unit basis more expensive thereby discouraging the increased use of electricity.

Since the Licensing Board ruled generally with respect to the group of contentions in which this contention was included that "the need for power from the proposed plant is . . . an issue in this proceeding," its disposition of this contention is consistent with *Niagara*. No evidence was offered and the Board did not further consider this contention, consistent with our views (discussed hereafter) on burden of proof in this area. Nevertheless, it is appropriate to state our position that we will not apply *Niagara* retroactively to cases which had progressed to final order and issuance of construction permits before *Niagara* was decided.

Administrative agencies have broad discretion to limit or preclude retroactive application of new rules developed in adjudication. See *SEC* v. *Chenery Corp.*, 332 U.S. 194, 203 (1947); *Department Store Union* v. *NLRB*, 466 F.2d 380, 388-390 (C.A.D.C. 1972); *NLRB* v. *Majestic Weaving Co.*, 355 F.2d 854, 860-861 (C.A. 2 1966). Among the factors to be weighed are whether the new rule represents a departure from prior practice, the reliance of the parties on past practice and consequent burdens imposed by retroactive application of the new rule, and the governmental interest in applying it to past cases. Weighing those factors in this context, we believe that the balance of relevant considerations dictates prospective application of our decisions in the unfolding area of energy conservation.

3. Contentions Relating to Customer Uses of Electricity

Several of Saginaw's "environmental contentions" apparently relate, wholly or in part, to possible customer uses of electricity. Most of these contentions are too vague to raise a factual issue in this context. Thus, contention 32 speaks of "the possibility of changing the present social stimuli to society which could result in decreased demand for electricity . . . ." Contentions 73 and 74, which we treat below as relating to demand projections, also appear to question—by reference to "social and scientific stimuli" and "useful social stimuli"—the "validity" of certain customer uses of electricity. Contention 76, which also discusses promotional activities, questions "whether a demand is created by encouraging the public to use unnecessary and nonutilitarian products which use large amounts of electricity in the course of fabrication and production."

The Dow Chemical Company plant in Midland will receive process steam and electricity from the proposed plant. Contention 34 suggests that certain of Dow's products, such as "chlorinated hydrocarbons or 2-4-5-T" may be harmful to the environment. The Licensing Board excluded this contention, rejecting "the argument that this proceeding must consider the social values of the end uses of the power to be produced." [11] The Appeal Board affirmed this ruling, observing that such contentions "seek to expand the NEPA review well beyond the pale of what we view as required by NEPA." [12]

Contentions of this kind do not, in our view, raise legitimate energy conservation issues. For example, the Saginaw contention concerning the alleged environmentally harmful characteristics of some of Dow's products has, at best, a very speculative effect on demand. Dow and similar companies manufacture a wide range of products. Should one product be discontinued for environmental reasons, it is reasonable to assume that another product would take its place. Thus, Dow's energy requirements and the need for the proposed plant would not be affected.

Moreover, as the Appeal Board pointed out in *Shoreham,*[13] prediction of the environmental effects of the uses of electricity is highly speculative and remote from the basic question whether the proposed plant should be authorized. See *First National Bank of Homestead* v. *Watson,* 363 F.Supp. 466, 5 ERC 1497 (D.D.C. 1973). The record here, as in *Shoreham,* reflects that the facility is needed to satisfy normal residential and industrial demand. Giving effect, therefore, to the rule of reason applicable under NEPA, and absent special circumstances, Licensing Boards are

[11] Order, p. 8.

[12] ALAB-123, RAI-73-5-331, 351-352.

[13] *Long Island Lighting Company* (Shoreham Nuclear Power Station), RAI-73-10-831, 853 (1973).

not required to entertain contentions concerning alleged environmental effects of customer uses of electricity.[14]

We note, however, that even with respect to these issues the Board did not exclude proferred evidence "at the threshold." Rather, respecting Saginaw's repeated concern with "useful social stimuli," the Board stated that Saginaw could "postulate its own view of socila [*sic*] validity, and argue the proposition at an appropriate time." [15] Thus, Saginaw was invited to recast these contentions in more specific terms, an invitation it did not accept.

4. Contentions Relating to Projected Demand

Six of Saginaw's "energy conservation" contentions, fairly read, related to the validity of electricity demand projections generally and for the proposed plant. Thus, contention 73 alleges very generally that demand projections should be analyzed from the perspective of ways to decrease demands for electricity. Contention 74 states that possible availability of electricity from sources other than the proposed plant to meet projected demands must be analyzed. Contention 81 questions the applicant's projections concerning continued industrial growth in the State of Michigan. Contention 87 questions the applicant's assumptions concerning future uses of room air conditioners. Contention 88 alleges that the applicant had incorrectly analyzed projected growth of its major users of electricity, such as General Motors and Dow Chemical. Contention 89 questions an asserted relationship between gross national product and the automobile industry, as it relates to the applicant's demand projections. None of these contentions

[14] In addition, inquiries into environmental effects of customer uses could lead to virtually interminable hearings on collateral issues. The hearing transcript in this protracted proceeding is almost 8,000 pages long, and the entire record exceeds 24,000 pages.

[15] Order, p. 11.

raise valid energy conservation issues—i.e., they do not indicate ways in which concededly accurate demand projections might be reduced.

In any event, the Licensing Board ruled that "the need for power from the proposed plant is . . . an issue in this proceeding," thereby allowing each of these contentions.[16] The Saginaw motion makes no reference to this ruling, and Saginaw introduced no evidence concerning these contentions. The record contains substantial evidence supporting the applicant's demand projections.[17]

5. Other Contentions

Saginaw argues that four other "energy conservation" contentions were improperly excluded. These remaining contentions have nothing to do with energy conservation, as we define that concept.

Contention 33 is concerned with whether Dow Chemical could purchase power from other of the applicant's generating facilities, whether Dow might modify its existing fossil fuel facilities, or whether Dow and other customers might procure electricity through "conventional means" or "other means not now known to man." None of these contentions is relevant to the reduction of projected demands for electricity. On the contrary, these contentions postulate the validity of projected demands, and argue that they should be met from other sources. The Appeal Board stated in this connection that—

> The applicant's ability to obtain electricity from other sources was the subject of extensive testimony, which fully supports the Board's finding that "outside sources are unavailable."[18]

---

[16] Order, p. 10.

[17] See Initial Decision, paragraph 47, TID-26300, pp. 214, 223.

[18] RAI-73-5-331, 351.

Contention 72 alleged certain deficiencies in the regulatory staff's assessment of costs of generating electricity through nuclear power. These alleged deficiencies related entirely to radiological matters. Contention 85 questions the applicant's assertion that the proposed plant will "maintain and enhance living standards." In a similar vein, contention 92 appears to question whether the need for electricity will provide jobs for an increased number of adults. The latter two contentions are too vague to raise an issue in this context and, in any event, seemingly have nothing to do with energy conservation.

SAGINAW'S PROCEDURAL DEFAULTS—BURDEN OF PROOF

Contrary to Saginaw's argument, its validity framed energy conservation contentions were allowed by the Licensing Board. We also believe, however, that serious procedural defaults by Saginaw in the course of these proceedings bear on the appropriate disposition of this motion.

The record in this case does not reflect any out-of-hand rejection of Saginaw's alleged energy conservation issues. The Board was obviously troubled, however, by the vague and rhetorical quality of many of these contentions. As to several contentions, Saginaw was invited to make more specific submissions.[19] Further, the Board acknowledged that "written detailed questions would undoubtedly be useful in further refining the issues to be contested" and invited submission of such questions.[20] Saginaw did not respond to these invitations.

The Board scheduled a hearing on environmental issues for May 1972. On the ground that its counsel was engaged in other matters, Saginaw requested an indefinite postponement of that hearing. The Board justifiably denied that re-

---

[19] See note 10, *supra*, and accompanying text, and page 28. [P. 272 this appendix.]

[20] Order, p. 2.

quest, and Saginaw did not appear or participate in the fourteen days of environmental hearings.[21]

Section 2.754 of our rules authorizes licensing boards to require submission of proposed findings of fact and conclusions of law by participating parties. All parties, including Saginaw, were directed to file proposed findings and conclusions.[22] The Saginaw submission stated with respect to environmental issues that they had "no conventional findings of fact to set forth." As the Licensing Board noted in its initial decision, this failure to file proposed findings and conclusions "made it virtually impossible in some instances to know whether particular issues of fact are contested."[23] Addressing the same point, the Appeal Board stated that "participation in this manner, in our opinion, subverts the entire adjudicatory process."[24] We agree. Particularly in these circumstances, Saginaw's complaint that it was not granted a hearing on alleged energy conservation issues comes with ill grace.

Saginaw argues in its reply that its procedural defaults are irrelevant. It contends that the Licensing Board must consider all environmental issues, whether contested or not, and that since the record in the case and the Board's decision do not in terms reflect consideration of "energy

[21] We agree with the Appeal Board's observation—"While the Board undoubtedly should attempt to accommodate legitimate requests for postponement, it is not required to accede to blanket requests for indefinite postponement which are not accompanied by a good-faith attempt to define a mutually convenient schedule. In any event, counsel who participate in AEC proceedings have an obligation not to over-extend their commitments so as to frustrate the objective of bringing licensing proceedings to a conclusion within a reasonable time frame." RAI-73-5-331, 352-353.

[22] Order of June 28, 1972.

[23] Initial Decision, TID-26300, pp. 214, 216 at n.10.

[24] ALAB-123; RAI-73-5-331, 332.

conservation," a remand for further proceedings is required.[25]

Established rules of burden of proof governing conventional civil litigation are not necessarily completely dispositive in agency licensing proceedings where affirmative public interest findings are requisite. See, *e.g., United Church of Christ* v. *FCC,* 425 F.2d 543, 546-550 (1969). Particularly is this true under NEPA, which, of course, imposes upon us an affirmative obligation to develop an adequate record upon which to assess the environmental impact of proposed nuclear plants. Giving appropriate recognition to these general principles, we must nevertheless have workable subsidiary rules for the orderly conduct of these proceedings.

The burden of proof on the ultimate question whether a permit or license should be issued is on the applicant. Administrative Procedure Act, § 7(c) (5 U.S.C. 556(d)); 10 CFR 2.732. This burden includes preparation of an environmental report describing the impact of the proposed action, including alternatives to the proposed action. 10 CFR Part 50, App. D, ¶ A.1(c). As *Niagara* makes clear, such alternatives may in particular cases include energy conservation alternatives. Consistent with NEPA, the Regulatory Staff must independently prepare draft and final environmental impact statements, including, in appropriate cases, discussion of energy conservation alternatives. Appendix D, ¶ A.8. And the licensing boards must, on the record thus developed, "independently consider the final balance among conflicting environmental factors" (Appendix D, ¶ A.11), including possible energy conservation factors.

[25] We attribute no significance to the absence of the phrase "energy conservation" from the record or the Board's decision. "Energy conservation" is only now becoming a term of art.

But workable rules in this setting must take into account that energy conservation is a novel and evolving concept.[26] NEPA "does not require a 'crystal ball' inquiry." *Natural Resources Defense Council* v. *Morton, supra.* at 837. This consideration has led us to hold that we will not apply *Niagara* retroactively. As we gain experience on a case-by-case basis and hopefully, feasible energy conservation techniques emerge, the applicant, staff, and licensing boards will have obligations to develop an adequate record on these issues in appropriate cases, whether or not they are raised by intervenors.

However, at this emergent stage of energy conservation principles, intervenors also have their responsibilities. They must state clear and reasonably specific energy conservation contentions in a timely fashion. Beyond that, they have a burden of coming forward with some affirmative showing if they wish to have these novel contentions explored further.[27]

This Commission, applicants, and public interest groups are involved in truly creative proceedings, hopefully striking reasonable balances between complex and frequently competing considerations. Particularly in this setting, there is a need for compliance with procedures designed to develop and refine the issues, and for a spirit of accommodation, if the system is to work. Saginaw fell far short in these respects.

---

[26] In its initial effort to deal with energy conservation questions, we note that the Federal Power Commission stated that "conservation of energy is currently an evolving concept . . . without a uniformly accepted definition . . ." *Measures to Implement Conservation of Natural Resources,* adopted November 13, 1973, 38 *Fed. Reg.* 31963, 31964.

[27] We do not equate this burden with the civil litigation concept of a *prima facie* case, an unduly heavy burden in this setting. But the showing should be sufficient to require reasonable minds to inquire further. Compare *United Church of Christ,* v. *FCC, supra.*

Insofar as the pending motion seeks clarification of our *Niagara* ruling, it has been granted. The motion is, in all respects, denied.[28]

It is so ORDERED.

By the Commission

GORDON M. GRANT
Acting Secretary of The Commission

Dated at Germantown, Maryland,
this 24th day of January, 1974.

---

[28] We have received a letter dated January 21, 1974, from Saginaw making additional allegations in support of its motion, and a telegram from the licensee in response. These submissions, as framed, do not affect our disposition of the matter.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

CLI-74-7

COMMISSIONERS:
DIXY LEE RAY, *Chairman*
CLARENCE E. LARSON
WILLIAM A. ANDERS

In the Matter of
CONSUMERS POWER COMPANY — Docket Nos. 50-329
50-330

(Midland Plant, Units 1 and 2) — February 5, 1974

Mr. HAROLD F. REIS, for the applicant.

Mr. MYRON M. CHERRY, for the Saginaw Intervenors.

Messrs. DAVID E. KARTALIA and ALBERT V. CARR, for the AEC Regulatory Staff.

Memorandum and Order

We have yet another petition from the Saginaw Intervenors seeking to reopen the record in the subject proceeding.[1] Even though we recently denied one petition filed by these Intervenors, and so advised the United States Court of Appeals for the District of Columbia Circuit where judicial review of this proceeding is pending, Saginaw now seeks to reopen on still other grounds.

Saginaw claims that after the final agency decision in this proceeding, entered a number of months ago, changed

[1] The petition is jointly signed by the Sierra Intervenors, represented by the same counsel as Saginaw, who are participating in the separate show cause proceeding involving the Midland facility. That proceeding, described in our Memoranda and Orders of December 20, 1973, and January 21, 1974, RAI-73-12-1082 and 74-1-7, is limited to quality assurance issues, and has nothing at all to do with the points raised here by Saginaw.

circumstances require us to reassess the NEPA cost-benefit analysis concerning the Midland facility. One alleged change, based on newspaper clippings, relates to increased construction costs of the facility. The other asserted change, not substantiated by anything, is that Dow Chemical Company may not actually purchase process steam from the facility upon its completion. The latter charge is similar to one made by Saginaw in a postscript to a letter dated January 21, 1974.

We decline to reopen on the grounds asserted. It is almost inevitable that particular facts may change in complex cases like this one between the close of administrative hearings, final agency action, and judicial review. This is especially true in the case of economic costs, which always reflect the impact of inflation. If such changes were to trigger rehearings, "there would be little hope that the administrative process could ever be consummated in an order that would not be subject to reopening." *ICC* v. *Jersey City*, 322 U.S. 503, 514 (1944). A response filed by the licensee negates Saginaw's unsupported assertion concerning Dow.[2] Accordingly, the Saginaw petition is denied.

It is so ORDERED.

By the Commission

R. E. MCKINNEY
Acting Secretary of the Commission

Dated at Washington, D. C. this 5th day
of February, 1974.

[2] The time for filing responses to this petition was fixed at February 4, 1974. The licensee's motion to fix that time at February 8, 1974, is denied.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

CLI-74-8

COMMISSIONERS:
DIXY LEE RAY, *Chairman*
CLARENCE E. LARSON
WILLIAM O. DOUB
WILLIAM A. ANDERS

In the Matter of CONSUMERS POWER COMPANY — Docket Nos. 50-329, 50-330

(Midland Plant, Units 1 and 2) — February 20, 1974

Mr. MYRON M. CHERRY, for the Saginaw Intervenors.

Memorandum and Order

On February 5, 1974 (RAI-74-2, p. 148), we denied a second petition from the Saginaw Intervenors seeking to reopen the record in the subject proceedings because of changed circumstances allegedly altering the NEPA cost-benefit analysis concerning the Midland facility. We have since received a letter from Saginaw supplementing that petition which we will treat as a petition for reconsideration.

Saginaw points out that under revised contractual arrangements between the licensee and The Dow Chemical Company, Dow will not be obligated to close down its existing fossil fuel generating facilities when steam and electricity become available from the Midland facility. This information was before us when we denied the last petition.* Moreover, it appears that notwithstanding these changed contractual arrangements, the Dow facilities may be operated only on a stand-by basis, or may be closed down.† In

*Opposition of Consumers Power Company, Attachment C.
†Id.

any event, the closing of Dow's fossil fuel facilities was but one of many factors in the overall NEPA cost-benefit analysis. Our review of the record as a whole shows that it was not a determinative factor. Accordingly, and in the interests of finality in these already protracted proceedings, we reaffirm our denial of the petition to reopen.

It is so ORDERED.

By the Commission

GORDON M. GRANT
Acting Secretary of the Commission

Dated at Germantown, MD this
20 day of February 1974.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

CLI-74-15

COMMISSIONERS:
DIXY LEE RAY, *Chairman*
WILLIAM O. DOUB
WILLIAM E. KRIEGSMAN
WILLIAM A. ANDERS

In the Matter of CONSUMERS POWER Co. — Docket Nos. 50-329, 50-330

(Midland Plant, Units 1 and 2) — April 11, 1974

Memorandum and Order

We have previously denied the Saginaw intervenors' repeated efforts to reopen these proceedings on a number of different grounds,[1] one of which dealt with Saginaw's unsupported charge that, as a result of contract renegotiations, the Dow Chemical Company may not actually purchase process steam from the completed Midland facility. A response to the charge filed by the Licensee assured us that Dow remained contractually obligated to purchase steam. On the basis of that assurance, without calling for the contract itself, we denied a Saginaw petition to reopen.[2]

Since then, however, with our orders stemming from these proceedings pending review before the United States Court of Appeals for the District of Columbia Circuit,[3] Dow took the rather unusual step of moving to withdraw

[1] Consumers Power Co. (Midland Plant, Units 1 & 2), RAI-74-1-19; 74-2-147; 74-2-149.

[2] RAI-74-2-147.

[3] *Aeschliman* v. *AEC, Saginaw Valley Nuclear Study Group* v. *AEC*, Nos. 73-1776 and 1867.

from the judicial proceedings, and its motion was granted.[4] This development, coupled with Saginaw's continued assertions that Dow's obligation to purchase steam and electricity from the completed Midland facility may now be illusory,[5] prompted us to call for all contracts executed by these parties dealing with the Midland facility.

We have carefully reviewed the relevant portions of these contracts and reaffirm our prior determination that there are no "changed circumstances", as alleged by Saginaw, warranting a reopening of these proceedings. We think it sufficient to note that Dow has a contractual commitment to purchase large quantities of process steam from the completed facility, that substantial purchases of electricity are also contemplated, and that Dow's existing fossil-fueled facilities are to be maintained primarily on a stand-by basis.

The contracts are hereby made a part of the record, and we are sending copies of the contracts to the Saginaw and Mapleton intervenors.

It is so ORDERED.

By the Commission

GORDON M. GRANT
Assistant Secretary of the Commission

Dated at Washington, D. C.
this 11th day of April, 1974.

[4] Order of March 25, 1974.

[5] Brief for the Saginaw petitioners, pp. 2-3.

ATOMIC ENERGRY COMMISSION
[10 CFR Part 50]

ENVIRONMENTAL EFFECTS OF THE URANIUM FUEL CYCLE

Notice of Proposed Rule Making

Notice is hereby given that the Atomic Energy Commission is considering possible amendments to its regulations in 10 CFR Part 50, Appendix D, "Interim Statement of General Policy and Procedure: Implementation of the National Environmental Policy Act of 1969 (Public Law 91-190)," that would specifically deal with the question of consideration of environmental effects associated with the uranium fuel cycle in the individual cost-benefit analyses for light water cooled nuclear power reactors.

The Commission's regulation implementing the National Environmental Policy Act of 1969 (NEPA) in 10 CFR Part 50, Appendix D, requires that each draft and final detailed statement prepared pursuant to section 102(2) (C) of NEPA for a nuclear power reactor contain a cost-benefit analysis which, among other things, considers and balances the adverse environmental effects and environmental, economic, technical, and other benefits of the facility. This regulation further provides that the cost-benefit analysis will, to the fullest extent practicable, quantify the various factors considered.

In several nuclear power reactor licensing proceedings it has been argued that the cost-benefit analysis for the facility that is the subject of the licensing action should include costs and benefits associated with the uranium fuel cycle, such as environmental effects of reprocessing spent fuel and disposal of wastes resulting from reprocessing. Other

factors related to the fuel cycle include those associated with uranium mining and milling, uranium hexafluoride production, isotopic enrichment, fuel fabrication, and transportation associated with the above. It has been urged that in each power reactor case the contribution of the nuclear power reactor to the environmental costs associated with the fuel cycle activity should be ascertained and considered in the cost-benefit balance.

The Commission's Atomic Safety and Licensing Appeal Board has held that environmental impact statements for nuclear power reactors should consider, among other things, environmental effects of the transportation of irradiated nuclear fuel from the facility that is the subject of the licensing action, and the transportation of low level wastes and of high level solid wastes other than irradiated fuel from the facility to depositories, but should not consider environmental effects of reprocessing of irradiated nuclear fuel, the disposal of wastes resulting from reprocessing, or disposal of low and high level solid wastes. In the matter of Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), Docket No. 50-271, Memorandum and Order, June 6, 1972. Subsequently, the Appeal Board in that case held that mining and manufacturing of reactor fuel are not within the scope of the environmental review prescribed for nuclear power reactors by NEPA and the Commission's regulations (Decision, October 11, 1972).

In connection with the foregoing, it should be noted that in conjunction with the revision of Appendix D of 10 CFR Part 50 on September 9, 1971, there was transmitted by the Director of Regulation to applicants for licenses to construct or operate nuclear power plants, and made available to the public, a document dated September 1, 1971, which, among other things, indicated that applicants' environmental reports should describe the environmental effects of

the transportation of fuel elements from the fuel fabrication plant to the reactor as well as the transportation of spent fuel elements from the reactor to the fuel reprocessing plant and the transportation of packaged radioactive material from the reactor to low level waste burial grounds.

There are in the United States well over 100 nuclear power reactors in operation, under construction, or on order, and, in addition, three commercial nuclear fuel reprocessing facilities have received operating licenses or are under construction. The existence of a uranium mine or mill, uranium hexafluoride plant, enrichment facility, fuel fabrication plant, fuel reprocessing plant, or ultimate waste depository does not depend upon the licensing of any one nuclear power reactor, nor does the cold or irradiated fuel or waste from any one reactor make more than a fractional contribution, if any, to the effects of such activities or facilities. Uranium mining and milling, uranium hexafluoride production, isotopic enrichment, and fuel fabrication will contribute fuel to many nuclear reactors and the effects associated with fuel reprocessing and waste disposal will be those associated not only with nuclear power reactors now operating or under construction, but also with those that are no longer in operation and those that are planned for the future. There does not appear to be any way to ascertain with any degree of certainty which of the uranium mines or mills, uranium hexafluoride plants, isotopic enrichment facilities, and fuel fabrication plants in existence or to be operated in the future will contribute fuel to a given nuclear power reactor, or which of the various fuel reprocessing plants or commercial burial grounds now in existence or to be constructed from time to time will receive irradiated fuel or wastes from any given nuclear power reactor.

Many of the various elements in the nuclear fuel cycle involve varying methods or processes with different en-

vironmental and other effects and there is no reason to believe that during the useful life of any given nuclear power reactor other methods or processes with different effects will not be developed. In addition, effects of uranium milling and mining, uranium hexafluoride production, fuel element fabrication, spent fuel reprocessing, operation of licensed burial grounds, and transportation incident to each of the above, are, except as those activities are subject to agreement State jurisdiction, the subject of Commission NEPA review proceedings associated with issuance of materials or facility licenses that are separate from the review proceedings for issuance of licenses for nuclear power reactors.

Cost-benefit analyses of nuclear power reactor license applications should contain a full and frank disclosure and consideration of costs and benefits of the proposed action. The results of the application of this principle to the question of inclusion of environmental effects associated with the fuel cycle are not entirely clear. As the above discussion indicates, the fractional contribution, if any, of the environmental effects of the fuel cycle to the cost-benefit balance for a particular nuclear reactor is difficult, and may be impossible, to ascertain with any degree of certainty. This suggests that such matters, if they are to be considered at all, be considered in a generic fashion through the rule making process. The Commission's regulatory staff has prepared a report entitled "Environmental Survey of the Nuclear Fuel Cycle," dated November 6, 1972, which provides a basis for an informed consideration of the generic question of the environmental impact associated with the uranium fuel cycle in light water cooled nuclear power reactor licensing proceedings.

To aid the Commission in its consideration of possible amendments to Appendix D to 10 CFR Part 50 of its regu-

lations that would deal with the question of the account to be taken of the enviromental effects associated with the uranium fuel cycle in individual cost-benefit analyses for light water-cooled nuclear power reactors, interested persons are invited to submit comments and suggestions, together with relevant data and information, with respect to possible additions to 10 CFR Part 50 along the following alternative lines:

(1) In the case of light water-cooled nuclear power reactors, the applicant's environmental report and the Commission's detailed statement shall contain a full discussion of, inter alia, the environmental effects of the transportation of cold fuel to the reactor and irradiated fuel from the reactor to a fuel reprocessing plant and the transportation of low level waste and high level solid wastes (other than irradiated fuel) from the reactor to depositories. Those documents need not cover the environmental effects of uranium mining and milling, the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, disposal of low level and high level solid wastes or transportation related to such activities (other than transportation of cold fuel to, and irradiated fuel from, the reactor), since the environmental effects of those activities as related to a particular light water-cooled nuclear power reactor have been analyzed in the Commission's "Environmental Survey of the Nuclear Fuel Cycle" and, when factored into the cost-benefit analysis, are sufficiently small as not to affect significantly the resultant conclusion. The environmental effects of the latter activities will generally be considered in detail in proceedings in which approval for such activities, or closely related activities, is sought.

(2) Or in the case of light water-cooled nuclear power reactors, the applicant's environmental report and the

Commission's detailed statement shall contain a full discussion of, inter alia, the environmental effects of the transportation of cold fuel to the reactor and irradiated fuel from the reactor to a fuel reprocessing plant and the transportation of low level wastes and high level solid wastes (other than irradiated fuel) from the reactor to depositories. In such documents, the contribution of the environmental effects of uranium mining and milling, the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, transportation and disposal of wastes resulting from such reprocessing, disposal of low level and high level solid wastes and transportation related to such activities (other than transportation of cold fuel to, and irradiated fuel from, the reactor) to the environmental costs of licensing the nuclear power reactor, shall be as set forth in the following Table S-3 of the Commission's "Environmental Survey of the Nuclear Fuel Cycle":[1]

[1] The "Environmental Survey of the Nuclear Fuel Cycle" provides the supporting data for this summary table.

TABLE S-3

SUMMARY OF ENVIRONMENTAL CONSIDERATIONS FOR NUCLEAR FUEL CYCLE (NORMALIZED TO MODEL LWR ANNUAL FUEL REQUIREMENTS)

Natural resource use	Total	Effluents — Chemical (MT)	Total
Land (acres):		Gases (including entrainment):[1]	
Temporarily committed	63	SO_x	4400
Undisturbed area	45	NO_x[2]	1170
Disturbed area	18	Hydrocarbons	11.3
Permanently committed	4.6	CO	28.7
Overburden moved (MT×10⁻⁶)	2.7	Particulates	1156
Water (gallons×10⁻⁶):		Other gases:	
Discharged to air	163	F_-	1.0
Discharged to water bodies	11,052	Liquids:	
Discharged to ground	123	$SO_4^=$	5.8
Total	11,338	NO_3^-	8.2
Fossil fuel:		Fluoride	0.4
Electrical energy (mw.-hr.×10⁻⁶)	317	Ca^+	5.4
Equivalent coal (MT×10⁻⁶)	116	Cl^-	8.2
Natural gas (s.c.f.×10⁻⁶)	103	Na	13.5
		NH_4	8.4
		Fe	0.4
		Tailings solutions (×10⁻⁶)	240
		Solids	91,000

Effluents—Radiological (curies)	Total	Maximum effect per annual fuel requirement of model 1000 MWe LWR
Gases (including entrainment):		
Rn-222	83	Principally from mills — Maximum annual dose rate <4 percent of average natural background within 5 miles of mill. Results in 0.06 man-rem per annual fuel requirement. Due to dilute concentration and short half-life of principal component, exposure beyond a 5-mile radius is minuscule relative to natural background.
Ra-226	.02	
Th-230	.02	
Uranium	.046	
Tritium (×10⁻⁶)	12	
Kr-85 (×10⁻⁶)	350	
I-129	.002	
I-131	.02	Principally from fuel reprocessing plants—Whole body dose is 4.4 man-rem for population within 50-mile radius. This is <0.005 percent of average natural background dose to this population.
Fission products	1.0	
Transuranics	.004	
Liquids:		
Uranium and daughters	2.4	Principally from milling—included in tailings liquor and returned to ground—no effluents; therefore, no effect on environment.
Ra-226	.027	From UF_6 production—concentration <5 percent of 10 CFR 20 for total processing of 27.5 model LWR annual fuel requirements.
Th-230	.27	
Th-234	.001	From fuel fabrication plants—concentration <1 percent of 10 CFR 20 for total processing 26 annual fuel requirements for model LWR.
Other uranium daughters	.001	
Ru-106	4	From reprocessing plants—maximum concentration <4 percent of 10 CFR 20 for total reprocessing of 26 annual fue requirements for model LWR.
Tritium (×10⁻⁶)	6.2	
Solids (buried):		
Other than high level	1,200	From mills—included in tailings returned to ground—no significant effluent to the environment.
Thermal (B.t.u. ×10⁻⁶)	3,370	

[1] Estimated effluents based upon combustion of equ valent coal for power generation.
[2] 1.2 percent from natural gas use and process.

The Commission will hold an informal rule-making hearing on possible amendments described in (1) and (2) above on February 1, 1973, at 10 a.m. The location and the presiding officer will be designated in a notice that will be published in the FEDERAL REGISTER in the near future.

Interested persons are invited to attend the hearing and present oral or written statements. Any person who intends to present views at this hearing should furnish in writing his name and the name of the organization he represents to the Secretary of the Commission by January 1, 1973. The hearing will be conducted as a legislative-type hearing. Since the hearing will be part of a rule making, rather than an adjudicatory, proceeding, the provisions of Subpart G, "Rules of General Applicability," of 10 CFR Part 2, the Commission rules of practice, will not be applicable.

Nothing herein shall be construed as affecting the continuing validity of the above-described holdings by the Appeal Board in the Vermont Yankee proceeding during the course of this rule making proceeding, and they shall continue in effect unless and until modified by promulgation of a regulation or other Commission action.

All interested persons who desire to submit written comments or suggestions in connection with the possible amendments to Appendix D of 10 CFR Part 50 or the "Environmental Survey of the Nuclear Fuel Cycle," should send them to the Secretary of the Commission, U.S. Atomic Energy Commission, Washington, D.C. 20545, Attention: Chief, Public Proceedings Staff, within sixty (60) days after publication of this notice in the FEDERAL REGISTER.

Copies of comments on this notice as well as the "Environmental Survey of the Nuclear Fuel Cycle," dated November 6, 1972, may be examined at the Commission's Public Document Room at 1717 H Street NW., Washington, DC 20545. In addition, copies of the environmental survey may be obtained upon request addressed to the Deputy Director for Fuels and Materials, Directorate of Licensing, U.S. Atomic Energy Commission, Washington, D.C. 20545.

(Sec. 161, 68 Stat. 948; sec. 102, 83 Stat. 853, 42 U.S.C. 2201, 4332)

Dated at Germantown, Md., this 10th day of November 1972.

For the Atomic Energy Commission.

PAUL C. BENDER,
Secretary of the Commission.

[FR Doc. 72-19698 Filed 11-14-72; 8:53 am]

ATOMIC ENERGY COMMISSION

[10 CFR Part 50]

[Docket RM-50-3]

ENVIRONMENTAL EFFECTS OF THE URANIUM FUEL CYCLE

Notice of Hearing

On November 15, 1972, the Atomic Energy Commission published in the FEDERAL REGISTER (37 F.R. 24191) a notice of proposed rule making concerning possible amendments to CFR Part 50, appendix D, that would deal specifically with the environmental effects associated with the uranium fuel cycle in the individual cost-benefit analyses for light water-cooled power reactors. The notice scheduled an informal rule making hearing on the possible amendments on February 1, 1973, at 10 a.m.

The location of the hearing will be New Executive Office Building, Room G-2008, 17th and H Streets NW., Washington, D.C.

A hearing board consisting of Max D. Paglin, Esq.—Chairman, Dr. Martin J. Steindler and Dr. John C. Geyer will preside.

As stated in the November 15, 1972, notice, the hearing will be part of a rule making, rather than an adjudicatory, proceeding and the provisions of Subpart G, "Rules of General Applicability," of 10 CFR Part 2, the Commission's rules of practice, will not be applicable.

The procedural format for the hearing will follow the legislative pattern, and no discovery or cross-examination will be utilized. It should be noted, however, that the report prepared by the Commission's regulatory staff, entitled 'Environmental Survey of the Nuclear Fuel Cycle," dated November 1972, which provides a basis for an informed

consideration of the generic question of the environmental impact associated with the uranium fuel cycle in light water-cooled nuclear power reactor licensing proceedings, is available to members of the public at the Commission's public document room at 1717 H Street NW., Washington, D.C. 20545. In addition, that report contains extensive references to background documents available to members of the public at the Commission's public document room.

The hearing will be conducted as informally and as expeditiously as practicable, consistent with affording the participants a reasonable opportunity to present their positions. Those participating in the hearing may, but need not be, represented by counsel.

Relevant written statements may be received for the record and those participating may, depending upon the number of requests received and the time available, be permitted to make brief oral statements of their views either in addition to, or in lieu of, written submissions. Persons making oral statements will not be sworn. Such persons, however, as well as persons offering written submissions at the hearing, will be subject to questioning by the presiding hearing board. All written comments and suggestions received pursuant to the invitation therefor set forth in the November 15, 1972, notice will be incorporated in the record of the proceeding.

The hearing board is authorized to take all necessary and appropriate action to control the course of the hearing, including, among other things, the holding of one or more procedural planning sessions. A transcript of the hearing will be made, and a copy of the transcript, together with copies of all documents presented at the hearing, will be placed in the Commission's public document room, 1717 H Street NW., Washington, D.C., where they will be available for inspection by members of the public.

At the conclusion of the hearing the record will be held open for a period of 30 days during which time any person may file such supplementary written statements as may be deemed appropriate in light of the hearing record. After the 30-day period expires, the presiding hearing board, without rendering any decision or making any recommendation, will forward the transcript of the hearing to the Commission together with an identification of issues raised at the hearing. The Commission will carefully consider the transcript of the hearing and the comments and suggestions submitted pursuant to the November 15, 1972, notice as well as other relevant considerations and factors, and, after reaching its determination in the rule making proceeding, will cause an appropriate notice to be published in the FEDERAL REGISTER.

(Sec. 161, 68 Stat. 948; sec. 102, 83 Stat. 853; 42 U.S.C. 2201, 4332)

Dated at Washington, D.C., this 27th day of December 1972.

For the Atomic Energy Commission.

PAUL C. BENDER,
Secretary of the Commission.

[FR Doc. 73-123 Filed 1-2-73; 8:45 am]

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

IN THE MATTER OF AMENDMENT OF 10 CFR PART 50 — LICENSING OF PRODUCTION AND UTILIZATION FACILITIES (Environmental Effects of the Uranium Fuel Cycle)	DOCKET NO. RM 50-3

REPORT TO THE COMMISSION BY THE NUCLEAR FUEL CYCLE HEARING BOARD

Pursuant to the Commission's directive in its Supplementary Notice of December 27, 1972 herein, the Nuclear Fuel Cycle Hearing Board forwards herewith to the Commission a report of the proceedings conducted, together with the record of the proceedings and an identification of the issues raised therein.

For the convenient reference of the Commission, there is set forth below a summary of the procedural course of the proceeding.

By Notice of Proposed Rulemaking published in the Federal Register on November 15, 1972 (37 F.R. 24191), the Commission announced a proposal to consider possible amendments to Part 50, Appendix D of its Rules which would deal specifically with the question of consideration of environmental effects associated with the Uranium Fuel Cycle in the individual cost-benefit analyses for light water-cooled power reactors. In conjunction with this Rule-

making, the Commission's Regulatory Staff, at the same time, issued for comment an Environmental Survey of the effects associated with producing the annual requirements for uranium nuclear fuel of a "model" light water-cooled power reactor capable of producing 1000 megawatts of electricity. The Environmental Survey, which was to serve as the basis for the Rulemaking Hearing, describes the effect of each stage of the cycle, from the mining and milling of natural uranium to the ultimate disposal of high level radioactive waste resulting from reprocessing of the used fuel. The Notice of Rulemaking invited the written comments of interested persons, to be filed by January 15, 1973, and scheduled an informal Rulemaking Hearing to be held on February 1, 1973, to permit the presentation of views, both oral and written, on two alternative approaches to consideration of the environmental effects of the Uranium Fuel Cycle in environmental statements, in terms of possible amendments to Part 50. The alternatives were set out in the Commission's Notice of November 15.[1]

Thereafter, in a Supplemental Notice of Rulemaking issued on December 27, 1972, the Commission set forth the procedural conditions which were to be followed in this informal, legislative-type rulemaking hearing. It was specified, among other things, that, since this would be part of a rulemaking rather than an adjudicatory proceeding, the provisions of Subpart G, "Rules of General Applicability",

[1] It should be noted that the language of Alternative (1) was amended on the record with a letter dated January 22, 1973, from Mr. Murray of the Regulatory Staff, in the following respects: the language to be amended appears in the right hand column of Page 24192 of the Federal Register of November 15, 1972, and concerns the revision of language in the penultimate sentence in Paragraph (1). The latter part of that sentence, as amended, is to read "activities as related to a particular light water-cooled nuclear power reactor have been analyzed in the Commission's 'Environmental Survey of the Nuclear Fuel Cycle' and if factored into the cost-benefit analysis, would be sufficiently small as not to affect significantly the resultant conclusion". (Tr. 53-54)

of Part 2 of the Commission's Rules of Practice would not be applicable and that no discovery or cross-examination would be utilized. However, the Notice provided that the participants in the hearing would be subject to questioning by the presiding Hearing Board.

On January 17, 1973, and pursuant to the authorization in the Supplemental Notice, the Hearing Board named by the Commission conducted a Procedure Planning Session to which all participants in this proceeding were invited. As a result of that session, a Further Notice of Rulemaking Hearing was issued by the Hearing Board on January 19, 1973, setting forth the schedule of appearances for participants who were to make oral presentations in addition to written submissions, and a statement of the understandings and agreements expressed by the participants at that session. There was attached to that Further Notice of Hearing a list of names and addresses of all the participants who had filed statements in this proceeding, and it was agreed by those present that the written submissions to be offered by the participants would be provided to the other participants in the proceeding named on the list.

The oral hearing commenced at 9:00 a.m. on the morning of February 1, 1973, and was completed in the afternoon of the next day, during which time oral presentations were made by members of the Regulatory Staff, a representative of the Environmental Protection Administration, and twelve other participants representing the industry, citizens groups, various State Agencies and individual citizens requesting to be heard. The Hearing Board incorporated by reference in the record of the proceeding, as though they had been set forth at length, certain pertinent documents in the proceeding, namely, the Commission's Notice of Proposed Rulemaking published in the Federal Register on November 15, 1972, the Environmental Survey of the

Nuclear Fuel Cycle issued by the Regulatory Staff of the Commission, the Commission's Supplemental Notice of Rulemaking Hearing issued December 27, 1972, and the Further Notice of Rulemaking Hearing issued by the Hearing Board on January 19, 1973. Questioning of the participants was conducted by members of the Hearing Board and further explanatory and supplementary written materials were requested and furnished by the various participants. Each of the participants was given all the time he had requested for his oral presentation and was afforded full opportunity to submit information and data for the record. A list of the participants submitting appearances, statements and written comments is attached hereto as *Appendix A*, and a list of persons making presentations at the oral hearing is attached as *Appendix B*.

During the course of the proceeding, it developed that one of the principal participants, Consolidated National Intervenors and Union of Concerned Scientists (CNI/UCS), intended to submit an extensive written document dealing with its comments and objections to the legal procedure being followed by the Commission in this proceeding and its comments on the sufficiency of the technical data in the Environmental Survey issued by the Regulatory Staff. It had indicated that its "final CNI/UCS report" would not be filed until the end of the 30-day post-hearing period, i.e., on or before March 4, 1973. Thereafter, CNI/UCS requested an extension of time until March 19th to file its "report". By Further Notice of Hearing dated February 16, 1973, the Hearing Board declared that the oral hearing was to be regarded as concluded as of February 16, 1973, and that the record was to remain open until and including March 19th, during which time any person could file such supplementary written statements as might be deemed appropriate in the light of the hearing record (in accord-

ance with the Commission's Supplementary Notice of December 27, 1972).

In response to the Motion for Extension of Time by CNI/UCS, the Board by Order of March 7, 1973, extended the time for CNI/UCS to file its statement on or before March 19th and permitted all participants other than CNI/UCS to be given a period of 7 days from March 19th within which to review the CNI/UCS filing to determine whether they wished to respond thereto and, if so, to request additional time therefor. Upon request, the Board granted several of the other participants extensions of time until April 16, 1973, to respond to the CNI/UCS Supplementary Comments.

The supplementary written submissions by the various participants were filed, respectively, on or before March 19th and the responses thereto on or before April 16, 1973, including the responses by the participants to the legal memorandum and technical comments filed by CNI/UCS. In its supplementary written statement, the Regulatory Staff also submitted a technical supplement entitled "Additional Information on Environmental Effects of the Uranium Fuel Cycle" which was designed, among other things, to respond to the questions raised by the Hearing Board and to the technical comments and questions of the other participants, and, accordingly, included revisions to the text and data of the original Environmental Survey.

With the foregoing documents, and the transcript of the Oral Hearing,[2] the record for this stage of the proceeding, to be submitted to the Commission, was completed.

[2] By separate Order of the Hearing Board, dated June 29, 1973, forwarded herewith, corrections to the transcript of the hearing, proposed by certain of the participants and those made by the Board, have been approved.

IDENTIFICATION OF ISSUES

As indicated above, the Commission directed the Hearing Board to forward to the Commission the record of this proceeding, together with an identification of the issues reflected by the hearing record. Accordingly, the Board submits the following description of the principal issues which it believes have emerged from these proceedings and which the Commission may wish to address in its consideration of the record.

1. The principal issue regarding the procedure used by the Commission on the instant rulemaking hearing was raised by CNI/UCS, who challenged the legality thereof.[3] At the oral hearing and its subsequent written submission, counsel for CNI/UCS argued, in substance, that in order for any rulemaking proceeding dealing with the Environmental Effects of the Nuclear Fuel Cycle on a "generic" basis to be legally valid, the procedures must be subject to the same adjudicatory hearing process which the Commission uses in the review of other technical safety and environmental issues, including the right of discovery and cross-examination. It contended that NEPA and the case law requires that the "environmental review" implicit in this rulemaking proceeding, which purports to replace the adjudicatory review conducted on the individual licensing case, must also be adjudicatory in nature.

In lieu of the two alternatives set forth in the Commission's Notice of Rulemaking, CNI/UCS suggested an "Alternative III", which would provide for an "on-going generic hearing", commencing with the preparation and circulation by the Staff of an environmental impact statement

[3] The comments filed by National Resources Defense Council, Inc. also contended that the commission's procedures herein did not comply with the requirements of NEPA.

of the fuel cycle. Parties to individual license hearings would participate in the rulemaking proceedings, which would be fully adjudicatory in nature and which would be heard before a designated Hearing Board. The "findings" of the Hearing Board at the conclusion thereof would then be incorporated into the record of the individual license hearings, subject, however, to challenge at the license hearing upon "a showing of good cause". CNI/UCS's proposed rule also contemplates that this generic hearing will be reopened and updated periodically as the advances in technology require revision of the impact statement, and that opportunity for adjudicatory hearings would be provided. New or modified findings by the Hearing Board would then be applied in the individual hearings.

The position of CNI/UCS as to the procedural requirements of the rulemaking proceeding was challenged in the responses and legal memoranda submitted by the Regulatory Staff, the utility companies represented by LeBoeuf, Lamb, Leiby & MacRae, (Alabama Power, et al), and the "14-Member Utility Group" represented by Hunton, Williams, Gay & Gibson. Citing extensive case law, it was the position of these participants that CNI/UCS was in error; that the AEC had adequate legal authority to formulate its regulatory policy in this area through the procedure of rulemaking; that adjudicatory processes are not required merely because the effect of the rulemaking would be to limit the issues which might otherwise be raised in a subsequent license proceeding; that the cases hold that the burden is on CNI to demonstrate that exceptional circumstances exist which require that adjudicatory processes be afforded in this rulemaking proceeding; and that no such showing has been made, nor have valid factual issues been raised which would call for the use of formal adjudicatory procedures.

The issue is thus presented for the Commission's consideration:

> Whether the Commission can validly promulgate regulations concerning the environmental effects of the Nuclear Fuel Cycle, to be used in subsequent individual nuclear power plant license hearings, by employing the notice and comment rulemaking procedures provided for in the Administrative Procedure Act, supplemented by oral presentations, questioning by a Hearing Board, and additional written submissions, comments and legal memoranda; or whether such rulemaking proceedings must be conducted with the full formal adjudicatory processes.

2. The record of the hearings contains reference by the participants to various omissions, inconsistencies and alleged errors of fact in the Environmental Survey issued by the Directorate of Licensing.[4] Further, the record of the hearing reveals that questions were raised as to the omission of any treatment in the Survey of the factors of safeguards against sabotage or possible diversion of nuclear materials, details of transportation, long-term environmental effects, selected aspects of mining and milling operations, details of various shipping operations, plutonium handling and others. A further example of alleged omissions from the Survey concerns the handling of plutonium isolated by the reprocessing plant[5] which is also included in references to the omission of "plutonium recycle" considerations.[6]

---

[4] See, for example, comments by AIF (2/2/73, Tr. p. 397 ff), Dep. Commerce (2/17/73), Consumers Power (1/11/73), Duke (1/12/73), Edlow (1/11/73), EPA (1/19/73, 2/1/73), GE (1/26/73, 3/1/73), Dep. Interior (2/23/73), NRDC (3/19/73), NY Dep. Env. Cons (1/18/73), Sierra Club (1/24/73), Tr. p. 190 ff, and others.

[5] Tr. p. 130-135, Duke Power (1/12/73), NRDC (3/19/73) and others.

[6] See, for example, submissions by AIF (Tr. p. 397 ff), Cons. Pwr (1/11/73), EEI (1/30/73), Sierra Club (1/24/73), and others.

At the time the Environmental Survey was issued for public comment in the Rulemaking Proceeding, together with the proposed amendments to the Rules, the Survey did not contain data with regard to proposed waste disposal systems. During the course of the oral presentation, the Regulatory Staff offered for the record an extensive presentation by Dr. Frank Pittman regarding various methods for waste disposal which were in the planning stage, and, based upon such planning, assigned various values regarding assumed environmental impact of such waste storage facilities. It was argued that, in all other respects, the Survey dealt with the environmental impact of actual and existing facilities; but that, with respect to waste disposal, the Survey was unreliable in that it dealt with non-existent facilities; and that the proposed Table S-3 in Alternative II did not take into account any of the data regarding waste disposal contained in Dr. Pittman's later presentation.

Finally, some of the participants contended that various alleged deficiencies in the Survey precluded them from full opportunity to explore and comment on the bases for the conclusions in the Survey and, hence, its substance.[7] The Regulatory Staff indicated, during the course of the proceeding and in its supplemental written submissions, that it intends to issue a substantially revised Environmental Survey in the light of the testimony and written comments submitted for the record in this proceeding, and to add to the Survey the Pittman presentation.

In light of the foregoing, the following issues are presented for the Commission's consideration:

Whether, in light of the comments and questions raised in this record as to the present technical adequacy of the

[7] See, for example, CNI (1/29/73, p. 10-11), NRDC (3/19/73). Sierra Club (1/24/73), Tr. p. 161 ff, and others.

Survey, a substantial revision of the Environmental Survey should be prepared and issued by the Commission prior to the final adoption of regulations amending Part 50 of the Rules.

Whether the Administrative Procedure Act requires the reopening of the proceeding to permit comment on the revised Survey which will probably contain, *inter alia*, the revisions in light of the record thus far made, the revised data regarding waste disposal, an amended Table S-3, and the concurrent Pittman presentation on waste disposal.

Whether such further Rulemaking Proceeding on the revised Environmental Survey should be a full proceeding of oral and written testimony and comment, in the manner conducted in the original Rulemaking Proceeding, in which comment will be invited on all aspects of the Nuclear Fuel Cycle; or whether the further proceeding should be limited to oral and written comment on merely the revisions to the Environmental Survey.

3. The record indicates the concern of a number of the participants as to the use in the Survey of qualitatively styled and allegedly undefined descriptive phrases as a basis for conclusions regarding the magnitude of the environmental impact.[8] These deficiencies are alleged to have hindered full and inclusive examination of the bases for the salient conclusions of the Survey.

In the light of these comments on the record of the Proceeding, issues appear to be raised in the following respects:

Whether the Survey should be revised to provide more precise definition of the magnitude and anticipated ranges

[8] See, for example, CNI (1/29/73, 3/19/73), AEC (3/19/73, Part I, p. 21), Cons. Pwr. (1/11/73), EPA (1/19/73), AIF (2/2/73 and Tr. p. 397 ff), NRDC (3/19/73), Tr. p. 138 ff, and others.

of variables pertinent to an assessment of the environmental impact, so that the Survey will be available for the broadest generic application, will meet minimum standards for technical soundness and will remain valid for an appreciable length of time.

Whether more extensive analyses of the long-term environmental effects of, among others, waste storage and/or disposal are required to sustain the validity of the conclusions reached in the Survey.

Whether the methodology employed in the preparation of the Survey — i.e. averaging of environmental effects and the use of models for each fuel cycle step — produced values sufficiently conservative to warrant conclusions indicated therein regarding negligible environmental impact.

4. The record indicates that the adequacy of the Survey's information may, at best, be limited to a few years from the date of issue.[9] Consequently, suggestions for revision and reexamination of the Survey at intervals have been presented in the record. These proposals by the participants and the Regulatory Staff raise an issue for resolution by the Commission in the following terms:

> Whether the Commission should indicate in its Report adopting Regulations that the Environmental Survey would have a stated limited term of applicability and that the Regulations adopted would, by their terms, provide for periodic reexamination and revision; and, if so, what would be the length of such term.

5. A number of the comments in the record referred to the impact of a Commission determination in this Rule-

[9] See, for example, EPA (1/19/73 and Tr. p. 153 ff), GE (1/26/73), AEC (3/19/73), Tr. p. 463 ff, and others.

making Proceeding upon pending licensing cases. It is noted that the Commission specifically referred to the matter in its Notice of Rulemaking of November 15, 1972 herein (37 F.R. 24192-3). It was argued, *inter alia,* that in order to avoid disruption of the pending licensing proceedings, the rule ultimately adopted should spell out clearly the circumstances under which it would be applicable to pending cases.[10] This proposal presents a question as to:

> Whether the Commission should, in the promulgation and implementation of any regulations governing the environmental impact of the Uranium Fuel Cycle, make provision for exemption or limited applicability thereof insofar as pending licensing cases are concerned.

6. Various parties, in their testimony and written comment, posed questions concerning the feasibility and sufficiency of the "Alternatives" (I and II) presented in the Commission's Notice of Rulemaking. The comments of the participants included (a) outright endorsement of the "generic" approach contemplated by the two proposed Alternatives and acceptance of either in their then expressed terms, (b) preferences for one or the other with reasons therefor, (c) proposals for modification of Alternative II, principally, and (d) advocacy of substitute "Alternatives" with a radically different approach (i.e., environmental impact statements, adjudicatory hearings, periodic updating hearings, etc.).

In light of the foregoing, the issue raised for consideration by the Commission is:

> Whether the Commission should reexamine the proposed "Alternatives", in the light of the record in the Proceed-

[10] See, for example, GE (1/26/73), Cons. Pwr. (1/11/73), CNI (3/2/73), AIF (2/2/73), "14 Member Utility Group", (1/15/73), p. 8, n. 9), AIF, Tr. 430-31.

ing to determine what modifications, if any, it wishes to make in its approach to a generic determination of the environmental effects of the nuclear fuel cycle.

7. The record indicates that some of the participants in the Proceeding raised questions as to the use of the descriptions of the various plants in the "typical" fuel cycle, as analyzed in the Survey as a basis for the development of a generic environmental statement.[11] The question was raised as to whether the values thus developed, being for the purpose of obtaining a generic assessment of the environmental impact, would be used in connection with license conditions and limitations. The record would appear to raise the following question:

> Whether the Commission's Report should make clear that the "model approach" used in the preparation of the Environmental Survey, and the values attendant thereto, constitute descriptive information only, and are not intended as operating limits which may be imposed in licensing and regulatory actions on various commercial plants which constitute part of the Nuclear Fuel Cycle.

8. Two other items arose during the course of the proceeding which the Board feels would merit the attention of the Commission:

(a) The record contains reference by some of the participants as to the matter of availability of reference materials and calculations used by the Staff as the basis for various conclusions in the Survey. Questions were also raised by the Hearing Board as to the ready availability and intelligibility of such background information and reference calculations, so that the public would have an adequate opportunity

[11] See, for example, AIF (2/2/73 and Tr. p. 402, p. 435, p. 454), Tr. p. 146, and others.

to evaluate and comment upon the validity of the conclusions in the Survey. It would appear that this aspect of the proceeding might well be addressed by the Commission in terms of a directive to the Staff to assure that the background references, reference materials, and various calculations, which served as the basis for conclusions in the Survey, be made readily available and usable for the public, in a form which is fairly identifiable, so that the spirit of the Public Information Act may be satisfied and that the public can have a realistic opportunity to examine the background materials upon which proposed action is based.

(b) The assessment of environmental impact of the Nuclear Fuel Cycle has been based on the "model" provided in the Survey. In licensing proceedings, consideration of NEPA environmental issues requires a cost-benefit analysis which considers and balances the environmental effects of the facility and the alternatives available for reducing or avoiding adverse environmental effects. Hence, the question is raised whether the requirements of NEPA call for a discussion of alternative processes with regard to the Fuel Cycle operations (underground *vs.* strip mining, acid *vs.* alkaline milling, storage of liquid wastes *vs.* storage of solidified wastes, etc.).

The foregoing constitutes the Report of the Hearing Board in this proceeding, as directed by the Commission.

Respectfully Submitted,

THE NUCLEAR FUEL CYCLE
HEARING BOARD

JOHN C. GEYER, Member
MARTIN J. STEINDLER, Member
MAX D. PAGLIN, Chairman

Issued at Washington, D. C.,
this 6th day of July, 1973.

APPENDIX A

DOCKET NO. RM 50-3

PARTICIPANTS SUBMITTING APPEARANCES, STATEMENTS AND WRITTEN COMMENTS

James P. Murray, Jr., Esq.
Regulatory Staff Counsel
U. S. Atomic Energy Commission
Washington, D. C. 20545

C. Wesley Smith, Manager
Licensing and Transportation
Nuclear Fuel Department
General Electric Company
175 Curtner Avenue
San Jose, California 95114

Anthony Z. Roisman, Esq.
Berlin, Roisman and Kessler
1712 N Street, N. W.
Washington, D. C. 20036
On behalf of Consolidated National Intervenors and Union of Concerned Scientists

Myron M. Cherry, Esq.
One IBM Plaza
Chicago, Illinois 60611

Joint Appearance and Comments By:
Baltimore Gas & Electric Company
Boston Edison Company
Consumers Power Company (Michigan)
General Public Utilities Corporation
Long Island Lighting Company
New England Electric System
Northeast Utilities Company (Connecticut)
Pacific Gas & Electric Company
Philadelphia Electric Company
Public Service Electric & Gas Company (N. J.)
San Diego Gas & Electric Company
Southern California Edison Company

Virginia Electric & Power Company
Yankee Atomic Electric Company
Submitted by George C. Freeman, Jr., Esq.
Hunton, Williams, Gay & Gibson
700 East Main Street
Richmond, Virginia 23212

Joint Appearance and Comments By:
Alabama Power Company
Commonwealth Edison Company
Consolidated Edison Company of New York, Inc.
Georgia Power Company
Niagara Mohawk Power Corporation
Omaha Public Power District
Power Authority of the State of New York
Rochester Gas & Electric Corporation
Submitted by Arvin E. Upton, Esq.
LeBoeuf, Lamb, Leiby & MacRae
1821 Jefferson Place, N. W.
Washington, D. C. 20036

John M. Arthur
Chairman of the Board and Chief Executive Officer
Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania 15219

Donald C. Lutken, President
Mississippi Power and Light Company
P. O. Box 1640
Jackson, Mississippi 39205

John W. Landis, President
Gulf General Atomic Company
P. O. Box 608
San Diego, California 92112

William D. Rowe
Deputy Assistant Administrator for Radiation Programs
U. S. Environmental Protection Agency
Washington, D. C. 20545

Professor Lawrence Ruby
College of Engineering
Department of Nuclear Engineering
University of California, Berkeley
Berkeley, California 94720

H. W. Brook, General Counsel and Secretary
Nuclear Fuel Services, Inc.
6000 Executive Boulevard
Rockville, Maryland 20852

Ken Dzugan, Research Scientist
Minnesota Pollution Control Agency
717 Delaware Street, S. E.
Minneapolis, Minnesota 55440

John D. Hoffman
Sierra Club Legal Defense Fund, Inc.
311 California Street
San Francisco, California 94104

Samuel R. Madison, Secretary
New York Public Service Commission
44 Holland Avenue
Albany, New York 12208

Dr. Terry R. Lash
National Resources Defense Council
664 Hamilton Street
Palo Alto, California 94301

Arnold R. Fritsch, President
Gulf United Nuclear Fuels Corporation
Grasslands Road
Elmsford, New York 10523

Franklin L. Gage
27 Hastings Avenue
Croton-on-Hudson, New York 10520

Mary E. Cahoon
Box 1333
Arkansas Tech.
Russellville, Arkansas 72801

David Reister
75 E. Northrup Place
Buffalo, New York 14214

J. Allen Overton, Jr.
President, American Mining Congress
1100 Ring Building
Washington, D. C. 20036

W. H. Owen, Vice President
Duke Power Company
Box 2178, Power Building
Charlotte, North Carolina 28201

Richard E. Raymond, Senior Vice President
System Engineering Operation
Florida Power Corporation
P. O. Box 14042
St. Petersburg, Florida 33733

Samuel Edlow, President
Edlow International
Suite 404-5
1100 17th Street, N. W.
Washington, D. C. 20036

H. P. Lyle, Vice President
Electric Production and Engineering
Northern Indiana Public Service Company
5265 Hohman Avenue
Hammond, Indiana 46325

Steve J. Gadler
2120 Carter Avenue
St. Paul, Minnesota 55108

Tom L. Johnson, Vice President
Jack C. Fensterstock
Teknekron, Inc.
1619 Massachusetts Avenue, N. W.
Washington, D. C. 20036

Edwin A. Wiggin, Executive Vice President
George L. Gleason, Vice President
Atomic Industrial Forum, Inc.
475 Park Avenue South
New York, New York 10016

John R. Lewis and
George L. Edgar, Esqs.
Morgan, Lewis and Bockius
1140 Connecticut Avenue, N. W.
Suite 1100
Washington, D. C. 20036
On behalf of Nuclear Materials and Equipment Corp. (NUMEC)

Babcock & Wilcox (B&W)
c/o George L. Edgar, Esq.
Morgan, Lewis and Bockius
1140 Connecticut Avenue, N. W.
Suite 1100
Washington, D. C. 20036

Richard H. Stroud
Executive Vice President
Sport Fishing Institute
608 Thirteenth Street, N. W.
Washington, D. C. 20005

W. J. Dollard, General Manager
Nuclear Fuel Division
Westinghouse Electric Corporation
Box 366
Pittsburg, Pennsylvania 15230

Raymond L. Dickeman, President
Exxon Nuclear Company, Inc.
777 — 106th Avenue, N. E.
Bellevue, Washington 98004

Dr. Leonard Geller
Vice President — Research
The S. M. Stoller Corporation
1250 Broadway
New York, New York 10001

J. Bruce MacDonald, Esq.
Deputy Commissioner and Counsel
New York State Department of Commerce
New York State Atomic Energy Council
99 Washington Avenue
New York, New York 12210

Ronald W. Pedersen
First Deputy Commissioner
State of New York
Department of Environmental Conservation
Albany, New York 12001

W. Donham Crawford, President
Edison Electric Institute
90 Park Avenue
New York, New York 10016

Michael I. Miller, Esq.
Isham, Lincoln & Beale
One First National Plaza
Chicago, Illinois 60670
On behalf of Commonwealth Edison Company

Carl L. Newman, Vice President
Consolidated Edison Company of New York, Inc.
4 Irving Place
New York, New York 10003

R. C. Youngdahl
Senior Vice President
Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

J. E. Watson
Manager of Power
Tennessee Valley Authority
818 Power Building
Chattanooga, Tennessee 37401

R. S. Hunter
Assistant Vice President and Chief Nuclear Engineer
American Electric Power Service Corporation
2 Broadway
New York, New York 10004

CHAPTER I — ATOMIC ENERGY COMMISSION
PART 50 — LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

Environmental Effects of the Uranium Fuel Cycle

On November 15, 1972, the Atomic Energy Commission published in the FEDERAL REGISTER a notice of consideration of possible amendments to Appendix D, Interim Statement of General Policy and Procedure: Implementation of the National Environmental Policy Act, 10 CFR Part 50, Licensing of Production and Utilization Facilities (37 FR 24191). The amendments proposed here supplement our established rules for fulfilling section 102(2)(C) procedures of NEPA. The amendments address the question whether to consider the environmental effects associated with the uranium fuel cycle in the individual cost-benefit analyses for light-water-cooled nuclear power reactors. The Atomic Safety and Licensing Appeal Board had earlier held that some such effects should be considered while others should not.[1]

The proposed amendments set forth two alternative approaches to considering the environmental effects associated with the uranium fuel cycle. Under the first, such environmental effects would not have to be considered in applicants' environmental reports and Commission detailed statements of environmental considerations since, if factored into individual cost-benefit analyses, they would be sufficiently small as not to affect significantly the resultant conclusion. Under the second alternative, the environmental effect as-

[1] Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), ALAB-56, ALAB-73 (June 6, 1972 and October 11, 1972).

sociated with the uranium fuel cycle, albeit small, would be factored into individual cost-benefit analyses in the form of numerical values derived from the instant proceeding. The second alternative has been adopted by the Commission as an effective rule, with certain clarifying and editorial changes. Insofar as this rule differs from the Appeal Board decisions in "Vermont Yankee" supra, those decisions have no further precedential significance. The Commission also notes that adoption of this amendment is without prejudice to consideration of whether or not a full generic environmental impact statement on the uranium fuel cycle should be issued pursuant to 10 CFR Parts 11 and 51 of the Commission's regulations.

The FEDERAL REGISTER notice announced the availability for comment of the "Environmental Survey of the Nuclear Fuel Cycle," dated November 1972, prepared by the Commission's Regulatory staff. This document was designed to serve as a primary data base for the proposed amendment and not as an analysis of alternatives and costs and benefits of the entire uranium fuel cycle. Indeed, certain portions of that overall fuel cycle are undergoing separate examination and are not involved in this proceeding. These include: (i) An environmental statement in support of a recommendation by the General Manager to continue the present program for developing Federal repositories for commercial high level wastes (38 FR 29350), and (ii) a separate rule making proceeding examining transportation of UO_2 fuel to and from light water reactors and transportation of solid wastes from such reactors to waste burial grounds (38 FR 3334).

In addition, another fuel cycle for light water reactors is under study by the staff. Typical programs underway on this subject include: (i) Preparation of a generic environmental impact statement concerning potential programs for

recycling plutonium in commercial light-water reactors (39 FR 5536), (ii) analysis of methods for disposal of wastes contaminated with plutonium, and (iii) an environmental analysis of the proposed amendment to 10 CFR 71 that would require significant quantities of plutonium to be shipped as a solid in packages providing at least double containment (38 FR 20482).

The survey described stages of the fuel cycle for the purpose of determining whether the cost-benefit analysis required by NEPA and our regulation (10 CFR Part 50, Appendix D) for environmental impact studies in licensing proceedings should include numbers quantifying effects of the uranium fuel cycle. The purpose of this proceeding was to make determinations as to whether certain elements should be factored into impact statements to be utilized in other proceedings; the purpose was not to undertake a full environmental review of the uranium fuel cycle. In short, this proceeding addresses a procedural question involving the implementation of NEPA's requirement for cost-benefit analyses in impact studies. For this reason, no environmental impact statement has been prepared in connection with the rule adopted today.

All interested persons were invited to submit written comments and suggestions in connection with the proposed amendments and the Environmental Survey within 60 days after publication of the notice in the FEDERAL REGISTER. In addition, an informal rule making hearing was held on February 1, 1973, to permit the presentation of written and oral views on the Environmental Survey and the alternative approaches to consideration of the environmental effects associated with the uranium fuel cycle.

On January 3, 1973, the Commission issued a Supplemental Notice setting forth the procedures which were to

be followed in the informal rule making hearing (38 FR 50). The notice stated, among other things, that since the hearing would be part of a rule making rather than an adjudicatory proceeding, the provisions of Subpart G, Rules of General Applicability, of Part 2 of the Commission's rules of practice would not be applicable and that, therefore, such procedural features as discovery and cross-examination would not be utilized. The notice provided, however, that the participants in the hearing would be subject to questioning by the presiding hearing board. The notice further provided that at the conclusion of the hearing, the record was to be held open for a period of 30 days during which time any person could file supplementary written comments deemed appropriate in light of the hearing record. After the expiration of the 30-day period, the presiding hearing board, without rendering any decision or making any recommendation, was to forward the hearing transcript to the Commission together with an identification of issues raised at the hearing.

Written comments were received from 46 individuals and organizations representing Federal and State agencies, industry, public utilities, environmental and citizen groups, and private citizens. Participants in the informal rule making hearing included the Commission's Regulatory staff; the Environmental Protection Agency; the Mapleton Intervenors of Midland, Michigan; Westinghouse Electric Corporation; Consolidated National Intervenors and the Union of Concerned Scientists, jointly; the Atomic Industrial Forum; the Consolidated Utilities, composed of fourteen utilities appearing jointly; the New York State Department of Environmental Conservation; and the Minnesota Pollution Control Agency. In addition, two individual members of the public made limited appearances.

In its "Report to the Commission by the Nuclear Fuel Cycle Hearing Board," submitted on July 6, 1973, pursuant

to a Supplemental Notice of Hearing published on January 3, 1973, the presiding hearing board identified a number of issues which it believed were raised at the hearing and in the written comments. The first issue identified concerned a challenge by CNI/UCS to the procedures used by the Commission for the hearing. That participant argued that for any rulemaking hearing dealing with the environmental effects of the nuclear fuel cycle on a generic basis to be legally valid, the hearing must incorporate the same adjudicatory procedural features used in individual production and utilization facility licensing proceedings, including the rights of discovery and cross-examination. On the basis of this contention, the participant recommended adoption of a "third alternative" which would provide for an "on-going generic hearing" requiring preparation and circulation of an environmental impact statement. Under this alternative, parties to individual reactor licensing proceedings would be permitted to participate in an "adjudicatory" rule making proceeding, the findings of which would be incorporated into the record of individual licensing hearings.

The Commission has considered this challenge to the legal validity of the present rule making proceeding and the arguments in opposition which were filed by other parties. In our view, the procedures adopted provide a more than adequate basis for formulation of the rule we adopted. All parties were fully heard. Nothing offered was excluded. The record does not indicate that any evidentiary material would have been received under different procedures. Nor did the proponent of the strict "adjudicatory" approach make an offer of proof — or even remotely suggest — what substantive matters it would develop under different procedures. In addition, we note that all documents including the Survey were available to the parties several weeks be-

fore the hearing, and the Regulatory staff, though not requested to do so, made available various drafts and handwritten notes.[2] Under all of the circumstances, we conclude that adjudicatory type procedures were not warranted here.

The second area in which issues were identified by the presiding hearing board related to the scope and depth of the underlying Environmental Survey. One issue was whether, in light of the comments in the record, substantial revision of the survey should be made prior to adoption of a final rule. Also identified was the issue of whether the Administrative Procedure Act requires reopening of the proceeding to permit comment on any revised survey and whether such reopened proceeding should be made a proceeding conducted in the manner of the original proceeding in which comment would be invited on all aspects of the nuclear fuel cycle; or whether such proceeding should be limited to comment only on the revisions to the Survey.

In discussing the issues in this area, the presiding hearing board mentioned, among other things, the factors of safeguards against sabotage and diversion of nuclear materials and plutonium handling. The board also indicated that arguments had been advanced that the Survey was unreliable with respect to high level waste disposal in that facilities for such disposal are presently non-existent.

Sabotage and diversion receive considerable attention in licensing of individual fuel cycle facilities. The issuance of any special nuclear material license involving significant quantities of such material is contingent upon a finding by the AEC that the required accountability and physical se-

[2] Some or all of these items might not have been provided under rigid adjudicatory rules. For example, on the one occasion when CNI/UCS requested a specific document, it was promptly made available, even though it was an internal staff memorandum written for the Commissioners themselves.

curity systems are adequate to provide reasonable protection against acts of sabotage and diversion of materials. Beyond this, insofar as environmental impact is concerned, sabotage and diversion may be viewed in the context of possible contributing factors, among others, to accident conditions. The Environmental Survey does, in fact, consider a number of postulated accidents and their environmental effects. The postulated accidents thus considered in the Survey are deemed to be a reasonable representation of the environmental effects that could result from the more credible acts of sabotage.

Those aspects of the uranium fuel cycle which involve plutonium handling, namely recovery and storage, were described in the Environmental Survey. However, other forms of plutonium handling were not discussed in the survey because the survey is applicable only to light-water-power reactors using conventional uranium dioxide fuel. Reactors utilizing plutonium recycle fuel fall outside the Survey's scope of coverage and, therefore, the values in the Summary Table are inapplicable. As stated earlier, however, the Commission is presently drafting an environmental impact statement covering all aspects of the full-scale use of plutonium in light-water reactors, including the fuel cycle.

Considerable information was presented at the hearing on high level waste storage, utilizing a retrievable surface storage facility. A description was given of such facility, the normal radiological effluents, and a maximum credible accident. The estimated normal annual radiological release was 0.005 curies. Although the ultimate capacity of the facility would be about 80,000 canisters of waste, corresponding to about 8,000 annual fuel requirements (AFR), the initial capacity will be substantially less. Even if one assumed that the annual release from the facility were associated with a single annual fuel requirement, the fission

product release per annual fuel requirement would be 0.005 Ci/AFR. Since the release of solid fission products and actinides from the model reprocessing plant is estimated at 1.004 Ci/AFR, the omission of waste repository effluents from the original Environmental Survey did not materially affect the releases shown in the Summary Table. However, the 0.005 Ci/AFR value has been added to the 1.004 Ci/AFR value in the Summary Table for a combined total, when rounded off, of 1.01 Ci/AFR. While such a waste storage facility has not been constructed, preliminary conceptual designs have been developed using existing technology based on well established data and techniques.

The Commission believes that the Survey and hearing record provide an adequate data base for the regulation adopted. Revisions to the chemical effluents in Table S-3 have been made to reflect corrections or suggestions entered into the hearing record on UF_6 conversion facilities, UO_2 conversion plants and mining operations. Minor corrections with respect to radioactive effluents have been made and in no case do these corrections increase the effluent effects by more than .25 percent of natural background. To conform the table precisely to the text of the Survey, the values for iodine-129 and 131 releases have been changed from .002 and .02 curies to .0024 and .024 curies, respectively. In addition, values for exposure of workers and the general public in the transportation of radioactive materials covered in the Survey have been added to the Summary Table. To incorporate these changes, to incorporate data on the retrievable surface storage facility in high level wastes described in the hearing, and to add information suggested in comments received as a part of the hearing record, the Environmental Survey has been revised and is being issued in revised form concurrently with promulgation of this

amendment.[3] In view of the fact that these revisions are minor and reflect the record already developed, we see no occasion for reopening this proceeding.

A third area in which issues were identified by the presiding hearing board relates to the Environmental Survey's use of qualitatively styled and allegedly undefined descriptive phrases for its conclusions regarding the magnitude of the environmental impact. One issue is whether the Survey should be revised to define more precisely the magnitude and anticipated ranges of variables pertinent to an assessment of the environmental impact. The Summary Table, S-3, to be used as a basis for evaluating the environmental effects in a cost-benefit analysis for a reactor quantifies all releases, and relates maximum effects to recognizable standards where practical. The Commission believes that providing ranges of variables relevant to assessing environmental impact would serve little or no constructive purpose here since conservatism was utilized in deriving the Summary Table values, and thus, these values already reflect an environmental impact greater than that which is truly anticipated. In addition, developing a range of values would have required separate investigations of multiple factors at over 150 mines, some 19 mills, 2 conversion plants, 3 enrichment plants, and 10 fuel fabrication facilities — to arrive at a range of values augmenting numbers already reflecting substantial conservatism.

Another issue identified in this area is whether more extensive analyses of the long-term environmental effects of waste storage and disposal are necessary to sustain the validity of the conclusions in the Survey. The Commission

---

[3] Among other things, the revised Survey refers to and gives excerpts from an analysis by the Environmental Protection Agency that show that the CNI/UCS analysis of the Nuclear Fuel Services operation does not accurately represent the most recent operating history of NFS.

believes that sufficient data were presented regarding engineered waste storage facilities to justify the conclusion that the contribution of waste storage and disposal to the total environmental impact of the fuel cycle is relatively insignificant. However, as more information on high level waste storage and disposal systems becomes available as a result of the environmental impact statement on high level waste storage referenced earlier, a more definitive assessment of the environmental impact can be undertaken and the Survey revised accordingly, as appropriate.

The third issue raised in this area is whether the averaging of environmental effects and the use of models for each fuel cycle step produced values sufficiently conservative to warrant the Survey's conclusion of negligible environmental impact. The "model" facilities defined for the Environmental Survey represent the true industry average for the UF_6 conversion, enrichment, and reprocessing portions of the fuel cycle. The model mill size chosen is near the upper range of mill sizes, and the major environmental effects from milling result from the airborne effluents and tailings waste disposal steps common to all mills. Choosing a relatively large mill as a basis tended to make local environmental effects large, and hence conservative. The fuel fabrication model plant is typical of two plants that produce about 60 percent of the fuel manufactured in the United States today and conservatively represents the remainder. The effluents from the model facility were estimated without taking credit for recently installed pollution-abatement equipment and the distance from the plant to the near site boundary of the model represents the smallest distance of any actual fuel fabrication plant. These model and effluent characteristics produce conservative estimates of environmental effects.

A fourth area in which the hearing board identified an issue relates to suggestions for revision and re-examination

of the Environmental Survey at periodic intervals. While the Commission agrees with the suggestions that the Survey be re-examined from time to time to appropriately accommodate new technology and information, it does not believe it necessary or advisable to impose any specific time limit. In our view, revision should be based on growth in the data base, not on any fixed and arbitrary time period. Should future revisions to the Survey necessitate changes in the Summary Table, further rule making will be undertaken and the public afforded an opportunity for comment.

A fifth issue identified by the hearing board is whether any provision should be made for exempting or limiting the applicability of a final rule insofar as pending licensing cases are concerned. In view of the fact that the environmental effects of the uranium fuel cycle have been shown to be relatively insignificant, the Commission believes that it is unnecessary to apply the amendment to applicant's environmental reports submitted prior to its effective date or to Final Environmental Statements for which Draft Environmental Statements have been circulated for comment prior to the effective date. However, Draft Environmental Statements prepared but not circulated for comment prior to the effective date will be revised in accordance with the provisions of the amendment.

The sixth issue identified is whether the Commission should re-examine the proposed "Alternatives" in light of the record of the proceeding to determine whether modifications are necessary or desirable. In reviewing the record of the rule making hearing the Commission finds general approval for its generic approach to the consideration to be given to the environmental effects associated with the uranium fuel cycle. Many participants advocated adoption of one alternative or the other, other participants proposed modified versions of the alternatives, and one participant

advocated adoption of a third alternative which was discussed earlier. After examining these proposals, and after re-examining its own proposed alternatives, the Commission has adopted a slightly modified version of Alternative 2. The Commission, as did many of the hearing participants and commentators, favors the approach of Alternative 2 over that of Alternative 1 because the former conforms with the requirements of subsections 3 and 8 of section A of Appendix D to 10 CFR Part 50 in that it quantifies, to the fullest extent practicable, the environmental effects of the uranium fuel cycle in individual cost-benefit analyses. Incorporation of the Summary Table values into cost-benefit analyses in environmental reports and detailed statements will also help to assure more complete and meaningful documents. The changes in the effective amendment are clarifying and editorial in nature.

The seventh issue identified is whether further clarification is necessary to make clear that the Environmental Survey and the Summary Table of values are purely descriptive and are not intended as operating limits which may be imposed in licensing and regulatory actions with respect to the various fuel cycle facilities. Neither the effective amendment nor the Environmental Survey state or imply that the values in the Summary Table are to be imposed as operating limits on present and future fuel cycle facilities. Such limits are established and governed by other AEC regulations, principally, the provisions of Part 20 of Title 10 of the Code of Federal Regulations, "Standards for Protection Against Radiation." Further clarification is considered unnecessary.

The presiding hearing board raised two additional items which it believed merited Commission attention. The first was more in the nature of a suggestion to the Commission that the Regulatory staff be directed to assure the ready

availability of the background references, reference materials, and various calculations which served as the basis for the conclusions in the Survey. Copies of all non-copyrighted material, together with prior drafts of the Environmental Statement marked up by the staff, and over 100 pages of handwritten calculations were given to the Public Document Room on January 5, 1973. Therefore, the Commission believes that the staff had already complied with this suggested directive by making these background references, uncopyrighted reference materials, previous drafts and the various calculations available in the AEC's Public Document Room.

The second item referred to is whether the Environmental Survey should have discussed alternative processes with regard to fuel cycle operations. The purpose of the Survey was to provide a data base from which numerical values could be derived which would reflect the environmental impact associated with the uranium fuel cycle. These values would then be factored into cost-benefit analyses for individual reactors under the alternative adopted. Whenever possible, Survey data were based on actual operating fuel cycle facilities in order to produce numerical values reflecting real or actual environmental impact. Where this was not possible, conservatism was utilized. As stated earlier, the Environmental Survey is not an impact statement, and therefore, a discussion of alternatives is not required. In addition, the Commission does not believe that the Survey is the appropriate place to discuss alternatives in view of the fact that alternatives are considered in the NEPA context in individual licensing actions on fuel cycle facilities. On the basis of the foregoing and consideration of the comments received, the record of the hearing and other factors involved, the Commission has adopted the amendment set forth below. The amendment is essentially identical to the

second alternative contained in the November 15, 1972 FEDERAL REGISTER notice (37 FR 24191), except for minor clarifying and editorial changes.

Pursuant to the Atomic Energy Act of 1954, as amended, and sections 552 and 553 of Title 5 of the United States Code, the following amendment to Appendix D to 10 CFR Part 50 is published as a document subject to codification.

1. A new subsection 15 is added to section A to read as follows:

15. (a) In applicant's environmental reports and the Commission's detailed statements for light-water-cooled nuclear power reactors, the contribution of the environmental effects of uranium mining and milling, the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, transportation of radioactive materials and management of low level wastes and high level wastes related to uranium fuel cycle activities to the environmental costs of licensing the nuclear power reactor, shall be as set forth in the following Table S-3 of the Commission's "Environmental Survey of the Uranium Fuel Cycle." No further discussion of such environmental effects shall be required.

(b) This section does not apply to any applicant's environmental report submitted pursuant to section 4 prior to June 6, 1974, or to any Final Environmental Statement for which a Draft Environmental Statement had been circulated for comment prior to June 6, 1974.

Effective date. The foregoing amendment is effective on June 6, 1974.

(Sec. 161, Pub. L. 83-703, 68 Stat. 948; Sec. 102 Pub. Law 91-190, 83 Stat. 853; (42 U.S.C. 2201, 4332)).

Dated at Washington, D.C. this 16th day of April 1974.

For the Atomic Energy Commission.

PAUL C. BENDER,
Secretary of the Commission.

TABLE S-3. — *Summary of environmental considerations for uranium fuel cycle*

[Normalised to model LWR annual fuel requirement]

Natural resource use	Total	Maximum effect per annual fuel requirement of model 1,000 MWe LWR
Land (acres):		
Temporarily committed	63	
Undisturbed area	45	
Disturbed area	18	Equivalent to 90 MWe coal-fired powerplant.
Permanently committed	4.6	
Overburden moved (millions of MT)	2.7	Equivalent to 90 MWe coal-fired powerplant.
Water (millions of gallons):		
Discharged to air	156	[illegible] percent model 1,000 MWe LWR with cooling tower.
Discharged to water bodies	11,040	
Discharged to ground	123	
Total	11,319	<4 percent of model 1,000 MWe LWR with once-through cooling.
Fossil fuel:		
Electrical energy (thousands of MW-hour)	317	<4 percent of model 1,000 MWe LWR output.
Equivalent coal (thousands of MT)	118	Equivalent to the consumption of a 45 MWe coal-fired powerplant.
Natural gas (millions of scf)	92	<0.2 percent of model 1,000 MWe energy output.
Effluents—chemical (MT):		
Gases (including entrainment):[1]		
SO_x	4,400	
NO_x[2]	1,177	Equivalent to emissions from 45 MWe coal-fired plant for a year.
Hydrocarbons	13.5	
CO	28.7	
Particulates	1,156	
Other gases:		
F-	.72	Principally from UF_6 production enrichment and reprocessing. Concentration within range of state standards—below level that has effects on human health.
Liquids:		
SO_4=	10.3	From enrichment, fuel fabrication, and reprocessing steps. Components that constitute a potential for adverse environmental effect are present in dilute concentrations and receive additional dilution by receiving bodies of water to levels below permissible standards. The constitutents that require dilution and the flow of dilution water are: NH_3—600 cfs. NO_3—20 cfs. Fluoride—70 cfs.
NO_3-	26.7	
Fluoride	12.9	
Ca^{++}	5.4	
Cl-	8.6	
Na^+	16.9	
NH	11.5	
Fe_3	.4	
Tailings solutions (thousands of MT)	240	From mills only—no significant effluents to environment.
Solids	91,000	Principally from mills—no significant effluents to environment.
Effluents—Radiological (curies):		
Gases (including entrainment):		
Rn-222	75	Principally from mills—maximum annual dose rate <4 percent of average natural background within 5 mi of mill. Results in 0.06 man-rem per annual fuel requirement.
Ra-226	.03	
Th-230	.02	
Uranium	.032	
Tritium (thousand)	16.7	Principally from fuel reprocessing plants—Whole body dose is 6 man-rem per annual fuel requirement for population within 50 mi radius. This is <0.005 percent of average natural background dose to this population. Release from Federal Waste Repository of 0.005 Ci/yr has been included in fission products and transuranics total.
Kr-85 (thousands)	350	
I-129	.0024	
I-131	.024	
Fission products and transuranics	1.01	
Liquids:		
Uranium and daughters	2.1	Principally from milling—included in tailings liquor and returned to ground—no effluents; therefore, no effect on environment.
Ra-226	.0034	From UF_6 production-concentration 5 percent of 10 CFR 20 for total processing of 27.5 model LWR annual fuel requirements.
Th-230	.0015	
Th-234	.01	From fuel fabrication plants—concentration 10 percent of 10 CFR 20 for total processing 26 annual fuel requirements for model LWR.
Ru-106[3]	.15	From reprocessing plants—maximum concentration 4 percent of 10 CFR 20 for total reprocessing of 26 annual fuel requirements for model LWR.
Tritium (thousands)	2.5	
Solids (buried):		
Other than high level	601	All except 1 Ci comes from mills—included in tailings returned to ground—no significant effluent to the environment, 1 Ci from conversion and fuel fabrication is buried.
Thermal (billions)	3,360	<7 percent of model 1,000 MWe LWR.
Transportation (man-rem): Exposure of workers and general public	.334	

[1] Estimated effluents based upon combustion of equivalent coal for power generation.
[2] 1.3 percent from natural gas use and process.
[3] Cs-137 (0.075 Ci/AFR) and Sr-90 (0.004 Ci/AFR) are also emitted.

(FR Doc. 74-9076 Filed 4-19-74; 8:45 am)